C21.5: 955/1

Vol. 955 Number 1

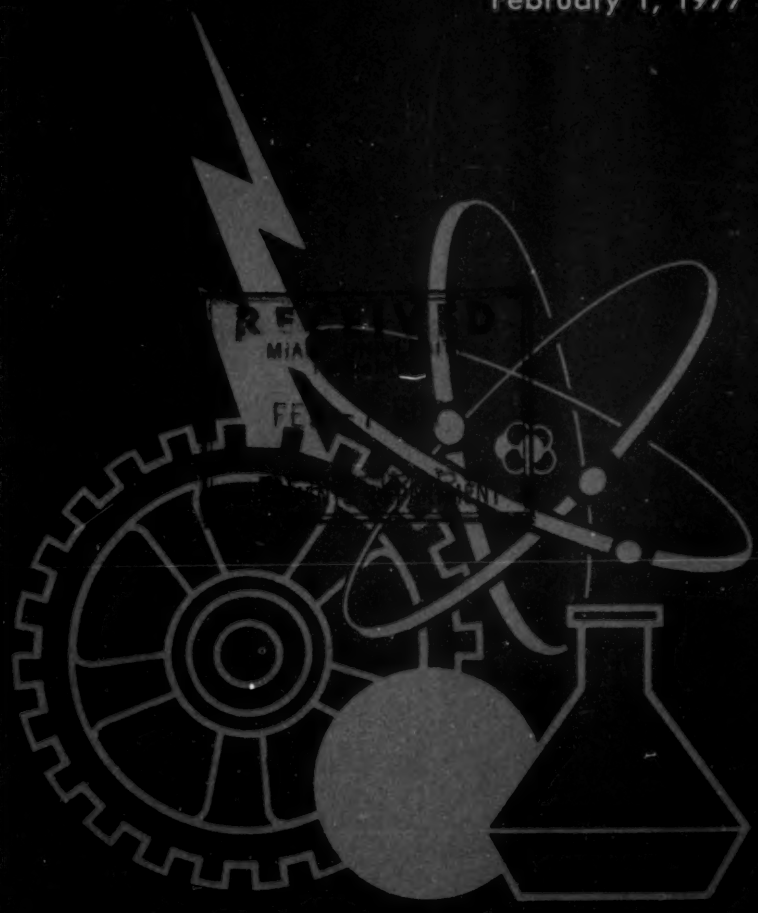
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

February 1, 1977



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

February 1, 1977 Volume 955 Number 1

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PATENT NOTICES

Certificates of Correction for the Week of Feb. 1, 1977

Re. 28,995	3,956,659	3,976,979	3,985,872
D. 240,558	3,956,709	3,977,016	3,985,875
D. 241,470	3,956,713	3,977,256	3,986,113
3,713,825	3,961,654	3,977,307	3,986,142
3,729,404	3,962,265	3,977,947	3,986,697
3,743,537	3,962,861	3,977,983	3,986,823
3,798,114	3,963,596	3,978,095	3,987,032
3,799,199	3,963,828	3,978,189	3,987,303
3,833,580	3,964,296	3,978,297	3,987,641
3,833,727	3,964,997	3,978,636	3,987,684
3,836,252	3,965,136	3,978,661	3,988,022
3,839,164	3,965,418	3,979,406	3,988,207
3,847,945	3,966,000	3,979,482	3,988,245
3,865,222	3,966,965	3,979,607	3,988,451
3,869,598	3,967,217	3,979,925	3,988,472
3,890,182	3,967,700	3,980,243	3,989,085
3,893,077	3,969,356	3,980,247	3,989,219
3,896,169	3,970,219	3,980,251	3,989,393
3,905,998	3,970,256	3,980,289	3,989,575
3,918,793	3,970,265	3,980,448	3,989,601
3,919,199	3,970,331	3,980,551	3,989,663
3,920,076	3,970,364	3,980,570	3,989,694
3,920,359	3,970,452	3,980,721	3,989,729
3,920,724	3,970,630	3,980,727	3,989,767
3,925,776	3,970,742	3,980,839	3,989,858
3,925,902	3,971,576	3,980,855	3,989,994
3,928,500	3,971,653	3,981,631	3,990,007
3,932,065	3,971,710	3,981,736	3,990,190
3,933,588	3,971,936	3,981,941	3,990,209
3,933,696	3,972,712	3,982,693	3,990,270
3,933,871	3,973,364	3,983,090	3,990,500
3,938,052	3,973,560	3,983,118	3,990,569
3,939,375	3,973,697	3,983,679	3,990,692
3,943,014	3,973,807	3,984,001	3,991,238
3,943,639	3,973,871	3,984,158	3,991,258
3,943,724	3,973,881	3,984,509	3,991,377
3,946,091	3,974,003	3,984,874	3,991,378
3,950,499	3,975,798	3,984,973	3,991,511
3,952,195	3,975,978	3,985,159	3,991,897
3,953,428	3,976,526	3,985,205	3,991,946
3,953,597	3,976,780	3,985,356	3,993,861
3,954,334	3,976,796	3,985,628	3,993,912
3,956,349	3,976,820	3,985,698	3,995,669
3,956,513	9,976,856	3,985,706	3,995,670
3,956,519	3,976,879	3,985,726	

Dedication

3,653,276.—*Matthew McIntyre* and *Harry Edwin Goodfellow*, Jackson, Tenn. REMOTE-CONTROL MIRROR SYSTEM. Patent dated Apr. 4, 1972. Dedication filed Oct. 1, 1976, by the assignee, *Harman International Industries, Inc.*

Hereby dedicates the entire term of said patent to the Public.

Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 3,462,487, R. W. Kinney, S. L. Neidleman, F. L. Weisenborn and J. S. P. Schwarz, CHEMICAL COMPOUNDS AND METHODS FOR PREPARING THE SAME, Interference No. 98,970, decided Oct. 12, 1976, claim 4.

Patent No. 3,684,683, Isao Ota, ELECTROPHORETIC LIGHT IMAGE REPRODUCTION DEVICE, Interference No. 99,028, decided Oct. 28, 1976, claims 1 and 13.

Patent No. 3,689,399, Isao Ota, PHOTOELECTROPHORETIC IMAGE REPRODUCTION DEVICE, Interference No. 99,027, decided Oct. 28, 1976, claims 1, 5, 7, 9, 14, 15, 16, 17 and 19.

Patent No. 3,697,366, George H. Harlock and Edward A. Burkard, LIGHTWEIGHT GYPSUM PANEL, Interference No. 99,139, decided Oct. 29, 1976, claim 1.

Patent No. 3,700,721, John A. Price and Mary J. Stewart, SULFOPHENOXY MALONATE COMPOUNDS, Interference No. 99,086, decided Sept. 9, 1976, claim 1.

Patent No. 3,712,473, George W. Ellenburg, REVERSE OSMOSIS MODULE, Interference No. 99,054, decided Sept. 14, 1976, claims 1, 2 and 3.

Patent No. 3,786,852, Robert W. Houston, TIRE CHANGER APPARATUS, Interference No. 99,010, decided Sept. 3, 1976, claims 1 and 10.

Patent No. 3,789,060, Harlan L. Goering, John N. Elkenberry and Gerald S. Koermer, FLUORINATED CAMPHOR DERIVATIVES AND EUROPIUM AND PRASEODYMIUM CHELATES THEREOF, Interference No. 98,924, decided Sept. 16, 1976, claims 1, 2, 3 and 5.

Patent No. 3,835,782, George L. Griffith and Donald W. Edwards, PRODUCT AND METHOD, Interference No. 99,183, decided Oct. 28, 1976, claims 1, 2, 3, 4, 8, 9, 20, 21 and 22.

Patent No. 3,876,421, Yozo Takemura, PROCESS FOR DESULFURIZATION OF MOLTEN PIG IRON, Interference No. 99,220, decided Oct. 12, 1976, claims 1 and 2.

Disclaimers and Dedications

Reissue No. 28,625.—*Robert A. Cunningham*, Bellaire, Tex. ROCK DRILL WITH INCREASED BEARING LIFE. Patent dated Nov. 25, 1975. Disclaimer and dedication filed Dec. 3, 1976, by the assignee, *Hughes Tool Company.*

Hereby disclaims and dedicates claims 1–15 of said patent.

3,027,477.—*Edward Emanuel Sheldon*, New York, N.Y. ENDOSCOPES. Patent dated Mar. 27, 1962. Disclaimer and dedication filed Nov. 1, 1976, by the assignee, *American Optical Corporation.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

3,265,892.—*Edward Emanuel Sheldon*, New York, N.Y. SCANNOGRAPH USING FLEXIBLE FIBER LIGHT CONDUCTORS. Patent dated Aug. 9, 1966. Disclaimer and dedication filed Nov. 11, 1976, by the assignee, *American Optical Corporation.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

3,423,620.—*Edward Emanuel Sheldon*, New York, N.Y. VACUUM TUBE DEVICE HAVING LIGHT CONDUCTING RODS AND LUMINESCENT SCREEN. Patent dated Jan. 21, 1969. Disclaimer and dedication filed Nov. 11, 1976, by the assignee, *American Optical Corporation.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Disclaimers

3,791,447.—*Arthur W. Smith, Ray A. Plummer*, and *Charles Wayne Johnson*, Houston, Tex. WELL METHODS FOR SAND BRIDGE REMOVAL USING SMALL DIAMETER TUBING. Patent dated Feb. 12, 1974. Disclaimer filed Jan. 2, 1976, by the assignee, *Big Three Industries, Inc.*

Hereby enters this disclaimer to claim 1 of said patent.

3,839,732.—*Mario E. Bachmann*, Northlake, Ill. MAGNETIC TAPE HEAD INDEXING MEANS FOR MULTITRACT TAPE PLAYERS. Patent dated Oct. 1, 1974. Disclaimer filed Dec. 8, 1976, by the assignee, *Motorola, Inc.*

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5 and 6 of said patent.

3,841,669.—*William George Luke* and *David Pender Datson*, Cornwall, England. SWIVEL JOINTS FOR PIPES. Patent dated Oct. 15, 1974. Disclaimer filed Nov. 30, 1976, by the assignee *English Clays Lovering Pochin & Company Limited.*

Hereby enters this disclaimer to claims 1–5 of said patent.

3,845,339.—*Alfred Merkle*, St. Georgen, *Fritz Schmifder*, Hornberg, and *Werner Heinzmann*, St. Georgen, Germany. PERMANENT MAGNET ROTOR ELECTRIC MOTOR. Patent dated Oct. 29, 1974. Disclaimer filed Dec. 6, 1976, by the assignee, *Papst-Motoren KG.*

Hereby enters this disclaimer to claim 14 of said patent.

3,876,447.—*Frank T. Lally*, Willowick, Ohio. METHOD OF APPLYING HARD-FACING MATERIALS. Patent dated Apr. 8, 1975. Disclaimer filed Nov. 22, 1976, by the assignee, *TRW Inc.*

Hereby enters this disclaimer to claims 1 thru 10 of said patent.

3,878,801.—*William R. Conner, Jr.*, Shelbyville, Tenn. LOADER-UNLOADER FOR AUTOMATIC SEWING APPARATUS. Patent dated Apr. 22, 1975. Disclaimer filed Nov. 26, 1976, by the assignee, *Stahl-Urban Company.*

Hereby enters this disclaimer to claims 1, 2 and 24 of said patent.

3,956,662.—*Gerald E. McTeague*, Portland, and *Kenneth R. Stinger*, Hillsboro, Oreg. CATHODE RAY STORAGE TUBE HAVING A TARGET DIELECTRIC PROVIDED WITH PARTICULATE SEGMENTS OF COLLECTOR ELECTRODE EXTENDING THERETHROUGH. Patent dated Mny 11, 1976. Disclaimer filed Dec. 3, 1976, by the assignee, *Tektronix, Inc.*

Hereby enters this disclaimer to claim 11 of said patent.

3,978,473.—*James J. Pastoriza*, Lincoln, Mass. INTEGRATED-CIRCUIT DIGITAL-TO-ANALOG CONVERTER. Patent dated Aug. 31, 1976. Disclaimer filed Nov. 18, 1976, by the assignee, *Analog Devices, Incorporated.*

Hereby disclaims the term of this patent subsequent to Aug. 15, 1989.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF DECEMBER 18, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	11-11-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-11-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-17-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-22-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	2-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-5-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	1-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-20-76

Expiration of patents: The patents within the range of numbers indicated below expire during January 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,919,443 to 2,923,007 inclusive
Plant Patents..... Numbers 1,893 to 1,900, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED FEBRUARY 1, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T955,001
TELEPHONE SET

Donald Michael Genaro, Haworth, N.J.; John Niel McGarvey, Drexel Hill, Pa.; Stanley Edward Seretny, Indianapolis, Ind.; Alvin Richard Tilley, Red Bank, N.J., and Carl Eugene Webb, Indianapolis, Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 3, 1975, Ser. No. 637,175

Int. Cl. D14/03

U.S. Cl. D26—14 A

2 Sheets Drawing. 1 Pages Specification

An ornamental design for a telephone is disclosed in which the telephone is arcuate and includes a pushbutton dial that has a planar face and rectangular pushbuttons. The longitudinal walls on each side of the dial vary in height, the walls having a greater height at their ends than in the middle. In addition, the portion of the set between the dial and the mouthpiece end of the set includes a planar inclined ramp that extends at an angle to both the flat surface of the dial and the curved surface of the set.

T955,002
FERTILIZER PROCESSES INCORPORATING SCRUBBED FLUE GAS SLUDGE BYPRODUCT

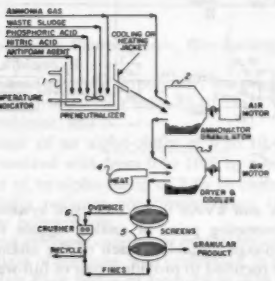
James J. Schultz, and Vincent J. Van Pelt, both of Florence, Ala., assignors to Tennessee Valley Authority

Filed Feb. 23, 1976, Ser. No. 660,054

Int. Cl.[2] C05F 7/00

U.S. Cl. 71—25

3 Sheets Drawing. 15 Pages Specification



LABORATORY EQUIPMENT USED TO PREPARE GRANULAR FERTILIZER FROM WASTE SCRUBBER SLUDGE

A process for the production of a granular fertilizer material from sludge materials discharged from scrubbing processes that remove pollutants from boiler flue gases. Waste sludge discharged from flue gas scrubber systems often contain large amounts of calcium and sulfur as well as lesser amounts of other compounds known to have plant nutrient value. The sludge is treated with an acid such as phosphoric, sulfuric or nitric, or a mixture of these, and ammonia. The resulting sludge-ammonia-acid salt mixture is combined with partially dried, previously processed solid material (recycle) in a horizontal rotating vessel. Additional ammonia and/or acid is added to the rotating vessel to cause the sludge-salt mixture to solidify and granulate. Other plant nutrients may be added to the rotating vessel during granulation. The granulated material discharged from the rotary vessel is further processed (dried, cooled, and screened) to obtain desirable moisture content and particle size.

T955,003
PHOTOGRAPHIC FILMS

David Roderick Mann, Colchester; Geoffrey Pickles Irvin, Brantham near Manningtree, and Richard Silverwood, Wivenhoe, all of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 548,221, Feb. 7, 1975, abandoned. This application May 4, 1976, Ser. No. 683,240

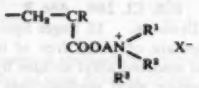
Claims priority, application United Kingdom, Feb. 21, 1974, 7871/74

Int. Cl.[2] G03C 1/78, 1/96

U.S. Cl. 96—87 A

2 Sheets Drawing. 27 Pages Specification

Anti-static photographic films comprise a self-supporting synthetic plastics film base, such as a polyethylene terephthalate film, having superimposed on at least one side a gelatin-containing subbing layer and a radiation-sensitive layer superimposed on the gelatin layer, in which an anti-static material is included in the gelatin-containing subbing layer or being interposed as a layer between the gelatin-containing subbing layer and the radiation-sensitive layer, said anti-static material comprising a polymer or copolymer containing repeating units of the formula:



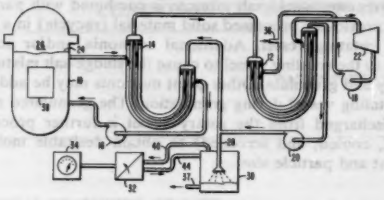
wherein R represents hydrogen or methyl, R^1 represents methyl or ethyl, R^2 and R^3 each independently represent methyl or ethyl or R^2 and R^3 taken together represent $-CH_2CH_2OCH_2CH_2-$ or $-(CH_2)_n-$ where *n* represents **4, 5** or **6**, A represents an alkylene or substituted alkylene group and X^- represents a chloride or acetate ion, said polymer or copolymer having an average molecular weight in the range 5,000 to 2,000,000. Preferred anti-static materials include a copolymer of equimolar amounts of trimethyl-β-methacryloyloxyethyl ammonium chloride and styrene; a copolymer of equimolar amounts of ethyldimethyl-β-methacryloyloxyethyl ammonium bromide and methyl methacrylate; a copolymer formed from equimolar amounts of trimethyl-β-methacryloyloxyethyl ammonium acetate and styrene; a copolymer formed from **15** mole % trimethyl-β-methacryloyloxyethyl ammonium chloride and **85** mole % styrene; a copolymer formed from **50** mole % ethyldimethyl-β-methacryloyloxyethyl ammonium bromide and **50** mole % methyl methacrylate and a homopolymer of trimethyl-β-methacryloyloxyethyl ammonium chloride.

T955,004

METHOD FOR HEAT EXCHANGER LEAK DETECTION IN A LIQUID METAL COOLED NUCLEAR REACTOR

Robert K. Sayre, Mount Lebanon, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 5, 1976, Ser. No. 673,563
Int. Cl.² G21C *17/00*
U.S. Cl. 176—19 R
2 Sheets Drawing. 20 Pages Specification



An on-line method for early detection of a leak through a tube of a liquid metal-to-water tube type heat exchanger in a liquid metal cooled nuclear reactor system. Introducing helium to the heat exchanger feedwater exposes the helium to any heat exchanger leak locations, and the helium will diffuse or flow through the leak location into the liquid metal. An increase in the helium content of the liquid metal evidences the existence of a leak. The content of helium in the liquid metal can be detected either by direct analysis of the reactor cover gas in a dual cycle reactor plant, or by removing a coolant sample from the reactor system downstream of the heat exchanger in a dual or triple cycle plant, separating the gaseous content of the sample, and analyzing the gaseous content for helium. The properties of helium are such that the invention method may result in identification of a tube leak before any water and liquid metal actually come in contact.

T955,005

PROCESS FOR PURIFICATION OF ALKYL METHACRYLATES

Athey C. Stutler; Max Statman, and Alden E. Blood, all of P.O. Box 2068, Longview, Tex. 75601

Continuation of Ser. No. 693,392, Dec. 26, 1967, abandoned. This application July 9, 1971, Ser. No. 161,356
Int. Cl. C07c *69/54*
U.S. Cl. 260—486 R
2 Sheets Drawing. 18 Pages Specification

Alkyl methacrylates are obtained free of impurities such as alkyl butyrates and assorted alkyl iodides by the partial crystallization of the crude alkyl methacrylate composition and subsequently contacting said crystals of alkyl methacrylate with liquid alkyl methacrylate to thereby free the crystals of occluded impurities.

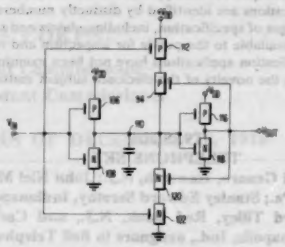
T955,006

DELAY CIRCUITS USING NEGATIVE RESISTANCE CMOS CIRCUITS

Joseph Richard Cavaliere, Hopewell Junction, and David Barry Eardley, Stanfordville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 536,080, Dec. 24, 1974, abandoned. This application June 14, 1976, Ser. No. 695,716
Int. Cl.² H03K *17/04, 17/60, 19/08, 19/20*
U.S. Cl. 307—251
3 Sheets Drawing. 19 Pages Specification

A negative resistance circuit constructed of complementary field effect transistors has several applications. A voltage change at an input to the negative resistance circuit alters the current at the input node in a direction inverse to that normally caused by such a voltage change. The circuit can be used to speed up the charging or the discharging of a circuit node capacitance.

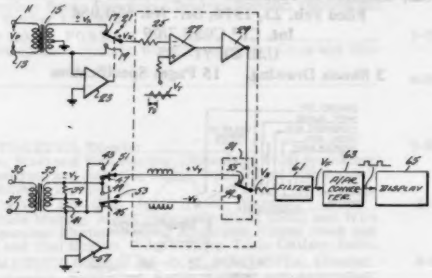


T955,007

METHOD AND APPARATUS FOR METERING APPARENT ENERGY

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, New York, N.Y.

Continuation of Ser. No. 528,041, Nov. 29, 1974. This application June 21, 1976, Ser. No. 697,892
Int. Cl.² G01R *21/06*
U.S. Cl. 324—141
1 Sheets Drawing. 14 Pages Specification



Metering kVA and kVAh in an electrical system is accomplished by generating pairs of analog signals representing current and voltage variables. Each of the analog signals is synchronously rectified to provide a pair of full-wave rectified signals which are multiplied together in a pulse-width amplitude multiplier network to produce a product signal having a DC component which is proportional to the product of the voltage and current variables. In addition, the product signal includes AC components which are filtered out in a low pass filter to thereby provide an output signal which is proportional to the apparent power in the electrical system. The apparent electrical power signal is converted to an apparent electrical energy signal by means of an analog to-pulse converter wherein each output pulse thereof corresponds to a predetermined amount of apparent energy in the electrical system.

T955,008

FLIP CHIP STRUCTURE INCLUDING A SILICON SEMICONDUCTOR ELEMENT BONDED TO AN Si_3N_4 BASE SUBSTRATE

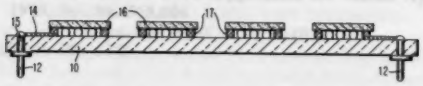
Lawrence V. Gregor, Hopewell Junction, and Robert G. Shepheard, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 498,487, Aug. 19, 1974, abandoned. This application June 7, 1976, Ser. No. 693,385

Int. Cl.² H01L *39/02, 29/04, 23/48, 29/40*

U.S. Cl. 357—80

2 Sheets Drawing. 13 Pages Specification



A semiconductor device and carrier assembly package having a silicon integrated circuit semiconductor device provided with at least three raised electrical contacts on a first surface, a device support substrate of Si_3N_4 provided with a conductive metallurgy pattern on at least one surface, the conductive pattern including an electrical contact configuration matching the raised electrical contacts on the device, metallurgical bonds between the raised electrical contacts on the device and the electrical contact pattern on the support substrate, and an electrically conductive means for electrically connecting elements of the conductive metallurgy pattern to coacting elements off the support substrate.

T955,009

FILM-FORMING COMPOSITION

Robert Clive Lansbury, 1 Tithe Barn Close, St. Albans, Hertfordshire, and Thomas Geoffrey Heggs, 14 Dolesbury Drive, Welwyn, Hertfordshire, both of England

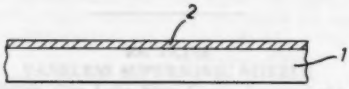
Filed May 24, 1976, Ser. No. 689,545

Claims priority, application United Kingdom, June 11, 1975, 25011/75

Int. Cl.² B32B *27/08*; B28B *3/20*

U.S. Cl. 428—515

1 Sheets Drawing. 35 Pages Specification



There is disclosed a thermoplastic, film-forming composition comprising a blend of

a. a propylene-ethylene copolymer, the propylene content of the copolymer being from 95 to 99.75% by weight of the copolymer, and

b. a polymer of an alpha-olefin of 4 to 10 carbon atoms copolymerized with from 0 to 10% by weight of the copolymer of an alpha-olefin of 2 to 10 carbon atoms,

the alpha-olefin polymer constituting from 41 to 90% by weight of the composition.

The propylene-ethylene copolymer preferably contains from 2 to 4% by weight of ethylene, and preferably, in granular form, exhibits a Melt Flow Index of from 10 to 200 g/10 minutes, measured according to ASTM/D1238-65T (Condition N).

The alpha-olefin component of the blend is suitably a polymer, preferably a homo-polymer, of butene-1, and suitably has a Melt Flow Index, by the aforementioned test, of less than 50 g/10 minutes, preferably between 5 and 40 g/10 minutes.

To ensure the production of films having acceptable optical characteristics, the alpha-olefin component preferably comprises from 45 to 65% by weight of the composition. Additives, such as pigments, anti-static agents, and the like, conventionally employed in film production, may be included in the composition, if desired.

The composition is suitably employed for the production of self-supporting films, and is particularly useful as a heat-sealable surface layer of a coextruded, biaxially oriented, multiple-layer film having a substrate layer of a propylene homo- or co-polymer. Such films are heat-sealable at comparatively low temperatures to provide strong heat seals, and are particularly suitable for the packaging of foodstuffs, and the like.

T955,010

HARDWARE/SOFTWARE MONITORING SYSTEM

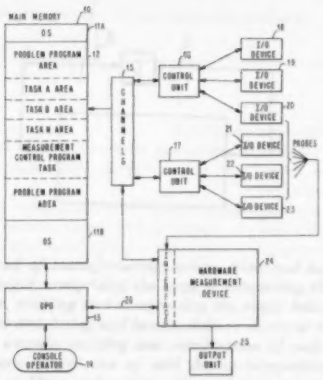
Ronald R. Ragonese, and Franklin D. Schulman, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 557,697, March 12, 1975, which is a continuation of Ser. No. 424,969, Dec. 14, 1973, abandoned, which is a continuation of Ser. No. 302,442, Oct. 31, 1972, abandoned. This application Aug. 12, 1976, Ser. No. 713,772

Int. Cl.² G06F *9/06*

U.S. Cl. 444—1

11 Sheets Drawing. 57 Pages Specification



A machine-implemented method of controlling, through software, the collection of data relating to the performance of a data processing system, where the data is gathered by hardware monitoring equipment and/or software monitoring methods whereby a simultaneous or separate hardware/software view of system and application program activity is obtainable. The method provides for immediate feedback of all hardware and software collected data into main memory for automatic, dynamic reconfiguration/modification of the system to improve operating efficiency. Specific examples of dynamic reconfiguration/modification include a method for maximizing the simultaneous utilization of processor/storage, i.e., maximizing CPU/channel overlap, maximizing the transfer of data over a channel, maximizing the number of data requests to a subsystem, and minimizing the time for an I/O request to be stacked in a queue.

REISSUES

FEBRUARY 1, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

NOTE: A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this issue. These entries will be in numerical order by document publication number.

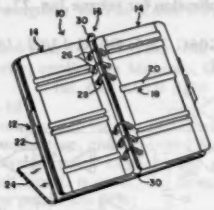
Re. 29,127
VISIBLE INDEX SYSTEMS

Alexander Patton Janssen, Charlottesville, Va., assignor to Datastrip Corporation, Charlottesville, Va.

Original No. 3,778,914, dated Dec. 18, 1973, Ser. No. 188,743, Oct. 13, 1971. Application for reissue Apr. 4, 1975, Ser. No. 565,006

Int. Cl.² G09F *1/00*; B32B *3/10*

U.S. Cl. 40—64 R **5 Claims**



1. A visible index system comprising: a rectangular insert support means having parallel facing flanges at opposite edges thereof; a plurality of elongated rectangular inserts of a thin, flexible material, each of said inserts being of sufficient length to span the support means, each said insert having recesses at the ends thereof and the flanges on the insert support means having means for selectively engaging said recesses, respectively, so as to removably affix said inserts to said support means with one of the major surfaces of each said insert fully exposed; an adhesive free label having an information receiving surface of generally the same width as the insert, said label being of a material on which the information can be entered by a multiple copy producing type of process; and means for attaching said label to said insert, said last-mentioned means being an adhesive layer on the exposed surface of the insert.

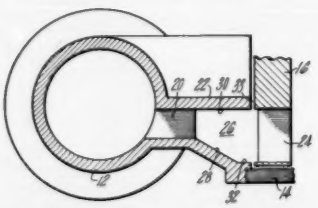
Re. 29,128
VANELESS SUPERSONIC NOZZLE

John S. Sohre, One Lake View Circle, Beaver Lake, Ware, Mass. 01082

Original No. 3,804,335, dated Apr. 16, 1974, Ser. No. 3,62,,403, May 21, 1973. Application for reissue Jan. 15, 1976, Ser. No. 649,478

Int. Cl.² B05B *1/34*; F01D *1/02*

U.S. Cl. 239—289 **38 Claims**



1. A converging-diverging nozzle unit for a supersonic expansion of a motive fluid for delivery to a turbine wheel, the nozzle unit including:

a plurality of nozzles in an array with converging flow passages between adjacent nozzles in the array;

an entrance and a throat in each of said flow passages, the throat being downstream of the entrance in the direction of flow of motive fluid through the passage; and

a common diverging expansion chamber connected to receive flow from said converging passages, said common diverging chamber extending from the vicinity of the throats of said converging passages downstream toward the turbine wheel.

Re. 29,129
METHOD OF MANUFACTURING ELEMENTS OF CRYSTALLIZED SUGAR

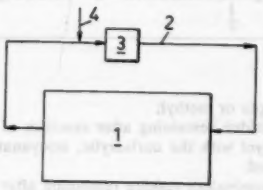
Georges François Duchateau, Tienen, and Paul Joseph Dewulf, Outgaarden, both of Belgium, assignors to Raffinerie Tirlemontoise, Brussels, Belgium

Original No. 3,756,855, dated Sept. 4, 1973, Ser. No. 148,042, May 28, 1971. Application for reissue May 22, 1975, Ser. No. 580,007

Claims priority, application Luxembourg, June 3, 1970, 61049

Int. Cl.² C13F *5/00*

U.S. Cl. 127—63 **3 Claims**



7. A method of manufacturing lumps, slabs and loaves of crystallized sugar, comprising the steps of moistening the crystallized sugar, molding and compressing the sugar into lumps, slabs or loaves and drying said lumps, slabs or loaves at a drying temperature wherein molding and compression of said moistened sugar are carried out at said drying temperature and wherein said molding and compression and drying are carried out in an environment which has a relative humidity less than 100% but more than 85% of the equilibrium relative humidity of the sugar at said drying temperature.

Re. 29,130
ENZYMATIC PROCESS USING IMMOBILIZED MICROBIAL CELLS

Chin K. Lee, and Margaret E. Long, both of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Original No. 3,821,086, dated June 28, 1974, Ser. No. 161,337, July 9, 1971. Application for reissue Oct. 14, 1975, Ser. No. 621,712

Int. Cl.² C12B *1/00*; C12D *13/02*

U.S. Cl. 195—31 F **14 Claims**

1. A process for effecting an enzyme-catalyzed transformation of a substrate in the presence of flocculated whole microbial cells having associated therewith active quantities of said enzyme which comprises contacting said substrate with an aggregate comprising said cells and a polyelectrolyte flocculating agent under conditions suitable for effecting said enzyme-catalyzed transformation and recovering transformed substrate.

Re. 29,131
RADIATION-CURABLE ACRYLATE-CAPPED POLYCAPROLACTONE COMPOSITIONS

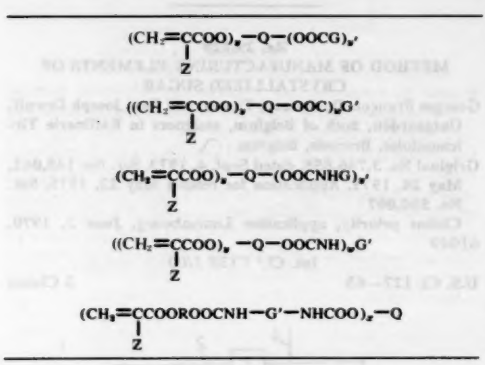
Oliver Wendell Smith, South Charleston, W. Va.; James Edward Weigel, White Plains, N.Y., and David John Trecker, South Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Original No. 3,700,643, dated Oct. 24, 1972, Ser. No. 69,127, Sept. 2, 1970. Continuation-in-part of Ser. No. 6,918, Jan. 29, 1970, abandoned. Application for reissue June 24, 1976, Ser. No. 699,471

Int. Cl.² C08G *22/16, 17/02, 41/04*

U.S. Cl. 260—77.5 AN **9 Claims**

1. Acrylate-capped polycaprolactones comprising compositions from the group consisting of:



wherein

Z is hydrogen or methyl;

Q is the residue remaining after reaction of the caprolactone polyol with the carboxylic, isocyanato and acrylyl compound;

G is the monovalent residue remaining after reaction of a substituted or unsubstituted monocarboxylic acid or monoisocyanate with the caprolactone polyol and acrylyl compound and is alkyl, aryl, alkenyl, aralkyl, alkaryl or cycloalkyl having up to about 12 carbon atoms;

G′ is the polyvalent residue remaining after reaction of a substituted or unsubstituted polycarboxylic acid or polyisocyanate with the caprolactone polyol and acrylyl compound and can be a linkage linear or branched alkylene having from 1 to about 10 carbon atoms, or arylene, alkarylene and aralkylene having from 6 to about 12 carbon atoms, cycloalkylene having from 5 to about 10 carbon atoms, and bicycloalkylene having from 7 to about 15 carbon atoms;

R is a linear or branched divalent alkylene having from 2 to about 5 carbon atoms;

X is alkyl having from 1 to about 3 carbon atoms or phenyl;

x is an integer having a value of from 1 to 4;

y is an integer having a value of 1 to 3;

y′ is an integer having a value of 1 to 3;

the sum of y plus y′ is from 2 to 4;

w is an integer equal to the valence of G′and can be from 2 to about 4;

n is an integer having a value of from 1 to about 10; and

z is an integer having a value of one.

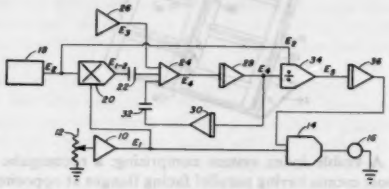
Re. 29,132
AUTOMATIC DRY COKE WEIGHT SYSTEM

Harold A. List, and Jack H. Baker, both of Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Original No. 3,814,914, dated June 4, 1974, Ser. No. 367,264, June 5, 1973. Application for reissue Jan. 27, 1976, Ser. No. 652,671

Int. Cl.² G06G *7/66;* **G01G** *13/02, 13/28*

U.S. Cl. 235—151.1 **3 Claims**



1. Apparatus for automatically measuring and controlling the net dry weight of discrete quantities of moisture-containing material, comprising:

(a) means for producing a first signal indicative of the actual weight of each discrete quantity of material;

(b) means for producing a second signal indicative of the moisture content of said material;

(c) means for producing a third signal indicative of the target dry weight for each weighing of said material;

(d) means adapted to receive said first, second and third signals and compute and store a fourth signal indicative of the target dry weight, plus the difference between said target dry weight and the actual dry weight of the instant weighing, plus the error in dry weight existing after the next preceding weighing;

(e) means adapted to receive said second signal and said fourth signal and compute and store a fifth signal indicative of the actual desired weight for the next weighing;

(f) timing means for controlling when said fourth and fifth signals are computed and stored; and

(g) means for shutting off the supply of said material to said next weighing when said first signal equals said fifth signal.

PLANT PATENTS

GRANTED FEBRUARY 1, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,013
ROSE PLANT—MEILIMONA VARIETY

Marie-Louise Meilland; Alain A. Meilland, both of Antibes, and Michele Meilland Richardier, Tassin-la-Demi-Lune, all of France, assignors to The Conard-Pyle Company, West Grove, Pa.

Filed Oct. 14, 1975, Ser. No. 622,509
Claims priority, application Morocco, Oct. 23, 1974, 16931
Int. Cl.³ A01H *5/00*
U.S. Cl. Plt.—15 1 Claim

1. A new and distinct variety of Hybrid Tea rose-plant of vegetative reproduction, characterized by the fact that,

from the physical point of view, the plant, with medium green adult wood, is erect, the flower is double, canary yellow; the petals are firm;

from the biological point of view, this rose-plant is of vigorous vegetation, blooms continuously, is very good for forcing; good resistance to diseases, its flowers last a long time, either when cut, or on the plant, and its petals drop off cleanly;

substantially as shown and described.

4,014
PEACH TREE

Mrs. Alexander B. Hepler, Jr., Long Beach, Calif., assignor to L. E. Cooke Co. Inc., Visalia, Calif.

Filed Apr. 5, 1976, Ser. No. 674,049
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—43 1 Claim

1. A new and distinct variety of peach tree, substantially as illustrated and described, characterized by a hardy, vigorous, well foliaged and productive tree producing fruit of good size, color and eating quality and further characterized by the ability of the tree to grow satisfactorily and produce regular, annual crops with substantially less winter chilling requirement than other similar varieties such as Elberta and Hale type peaches; the variety is further characterized by ease of propagation by usual nursery methods.

PATENTS

GRANTED FEBRUARY 1, 1977

ERRATA

For CLASS	See PATENT NO.
141–067	4,005,668
271–161	4,005,794
325–038 R	4,005,818
428–537	4,005,954
429–072	4,006,035
427–123	4,006,036
429–176	4,006,037
106–195	4,006,049
200–061.64	4,006,121
526–017	4,006,126
536–017	4,006,133
536–117	4,006,134
260–309.6	4,006,247
358–196	4,006,290
358–092	4,006,291
358–128	4,006,292
358–128	4,006,293
358–127	4,006,294
358–127	4,006,295
358–106	4,006,296
358–136	4,006,297
358–240	4,006,298
358–293	4,006,299
358–254	4,006,300
358–248	4,006,301
235–068	4,006,344
235–069	4,006,345
324–166	4,006,417

PATENTS

GRANTED FEBRUARY 1, 1977

ERRATA

CLASS	PATENT NO.
141-027	4,005,868
271-161	4,005,794
325-038 R	4,005,819
429-337	4,005,954
429-072	4,006,035
427-127	4,006,036
429-176	4,006,037
106-195	4,006,040
260-061.04	4,006,121
328-017	4,006,128
356-017	4,006,133
356-117	4,006,134
260-704 G	4,006,247
358-169	4,006,280
358-092	4,006,291
358-128	4,006,292
358-128	4,006,293
352-127	4,006,294
358-127	4,006,295
358-106	4,006,296
358-128	4,006,297
358-260	4,006,298
358-293	4,006,299
358-254	4,006,300
358-248	4,006,301
219-068	4,006,344
219-080	4,006,345
358-156	4,006,417

PATENTS

GRANTED FEBRUARY 1, 1977

NOTE: A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,005,494

POCKET SOCK AND METHOD OF KNITTING SAME

William H. Burn, Niota, Tenn., assignor to The Pocket Socks Corporation, Ten Mile, Tenn.

Filed Oct. 20, 1975, Ser. No. 623,982

Int. Cl.² A41B *11/00*

U.S. Cl. 2—239 **9 Claims**

1. A sock including integrally and circularly knit foot, leg and cuff portions with said leg portion being knit throughout at least the major portion thereof of complete seamless courses of body yarn, said cuff portion including elastic yarn incorporated with the body yarn to contract said cuff portion and to aid in supporting said cuff portion on the leg of the wearer, and a pocket having an opening positioned below said cuff portion extending partially around said leg portion, the positioning of said opening below said cuff portion being no greater than the length of said cuff portion so that said cuff portion may be turned down to cover said pocket opening for concealing and maintaining articles in said pocket, said pocket extending downwardly along said leg portion from said opening and comprising first and second layers of knit fabric formed of partial courses, said first and second layers of said pocket each including an upper end integrally knit with said leg portion, the lower ends of said first and second layers of said pocket being integrally knit and joined along a fold line extending across the lower end of said pocket, and stitching means extending along opposite sides of said pocket and joining said first and second layers to each other.

4,005,495

CERAMIC CAP BONE PROSTHESIS AND METHOD OF IMPLANTATION

Helmut Locke, Lauf, Pegnitz, Germany, and Martin Salzer, Vienna, Austria, assignors to Rosenthal Technik AG, Germany

Filed Apr. 16, 1976, Ser. No. 677,799

Claims priority, application Germany, Aug. 9, 1975, 2535649

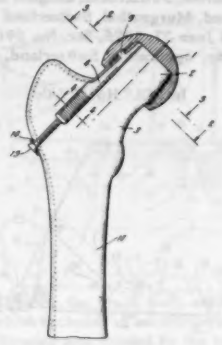
Int. Cl.² A61F *1/24*

U.S. Cl. 3—1.91 **13 Claims**

1. Improved implant for an endoprosthesis comprising;

a cap to be placed over the end of a bone; said cap being generally spherical in shape on its exterior; said cap having an opening into one side thereof and extending into its interior; said opening being defined by side walls shaped to form said opening into a shape that securely seats and fits on the end of the bone;

a thrust plate extending into said opening and having engagement means engageable with said side walls and being in engagement therewith; said thrust plate extending a distance away from said cap to an end of said thrust plate; fastening means in engagement with said thrust plate end for holding said thrust plate to the bone.



4,005,496

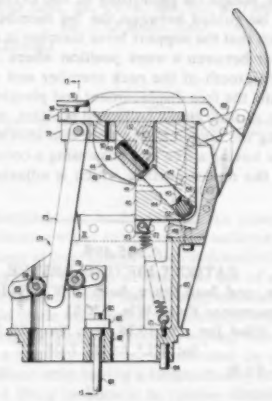
PROSTHETIC KNEE JOINT

Donald F. Wilkes, Albuquerque, N. Mex., assignor to Hosmer/-Dorrance Corporation, Campbell, Calif.

Continuation-in-part of Ser. No. 484,627, June 28, 1974, abandoned. This application June 13, 1975, Ser. No. 586,544

Int. Cl.² A61F *1/04, 1/08*

U.S. Cl. 3—27 **34 Claims**



9. A prosthetic knee joint having a pair of relatively movable members wherein the improvement comprises:

a brake drum provided for one of said pair of members and having opposed braking surfaces;

resilient brake shoe means carried by the second of said pair of members and having a longitudinal member with spaced ends positioned adjacent the braking surfaces, the longitudinal member being operable to increase spacing between said ends in response to a transverse squeezing force so that the resilient brake shoe means is operable to frictionally engage said brake drum;

means for selectively applying a transverse squeezing force to said longitudinal member, said means for applying force carried by the second of said pair of members,

whereby said resilient brake shoe means engages said brake drum to resist relative movement between said pair of relatively movable members.

4,005,497

SUPPORTING PLATE ARRANGEMENT

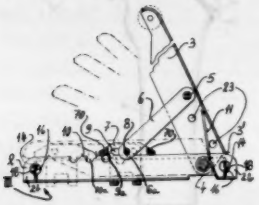
Erhard Sutter, Sursee, Switzerland, assignor to Hermann Lanz AG, Switzerland, Murgenthal, Switzerland

Filed June 27, 1975, Ser. No. 591,116

Claims priority, application Switzerland, July 12, 1974, 9632/74

Int. Cl.² H61G 7/06

U.S. Cl. 5—68 **21 Claims**



1. A support plate arrangement for adjusting the inclination of at least one part of a repose surface of reclining furniture, comprising two levers, means for hingedly interconnecting said two levers to form a pair of hinged levers, one of the levers being constituted by a rack member secured to the reclining furniture said rack member having teeth and possessing a substantially U-shaped profile including leg members having leg edges provided with teeth, a slide member displaceable upon the rack member in the lengthwise direction of the rack member during adjustment of the reclining furniture, a support lever member, means for hingedly connecting the support lever member at the other lever defining a second hinged lever, means for permitting an end of the support lever member to be guided between the leg members of the rack member such that the support lever member is movable in the slide member between a work position where it is in engagement with the teeth of the rack member and a rest position which permits the free displacement and pivoting of the levers towards one another into a collapsed position, means provided for spreading the hinged levers from one another, said second hinged lever having a free end possessing a contact surface for the part of the repose surface which is adjustable in inclination.

4,005,498

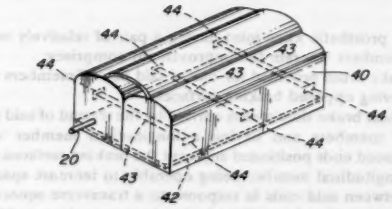
PATIENT LIFTING DEVICE

Frank Starr, and Jean Starr, both of N76 W14214 Appleton Ave., Menomonee Falls, Wis. 53051

Filed Jan. 19, 1976, Ser. No. 650,515

Int. Cl.² A61G 7/08

U.S. Cl. 5—81 R **6 Claims**



1. An inflatable device for lifting hospital patients comprising:

a. an elongated inflatable pad having a generally flat bottom section and a top section having a longitudinal recess; said bottom section and said top section being interconnected by sidewalls;

b. a source of fluid pressure;

c. conduits interconnecting the source of fluid pressure to said inflatable pad; and

d. a control panel affixed to said top section of said pad and covering said longitudinal recess, said control panel and said recess defining a control pocket, said control pocket being open ended on at least one end for receiving an attendant's arm, inflation of said pad applying a lifting force to the attendant's arm and to the patient for facilitating control of a hospital patient during inflation of said pad.

4,005,499

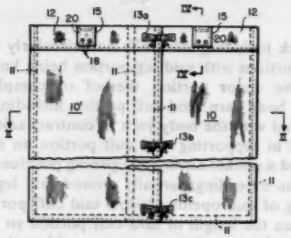
INDIVIDUALIZED BED COVERING

Miriam Travis Klein, 6416 Landview Road, Pittsburgh, Pa. 15217

Filed Mar. 12, 1976, Ser. No. 666,319

Int. Cl.² H47G 9/00

U.S. Cl. 5—334 R **7 Claims**



1. In an improved two-part bed covering, a pair of longitudinally-extending fabric body parts that are adapted to be placed in a side-by-side lengthwise-aligned relation on the bed, each said body part having a relatively narrow hemmed edge along its opposed longitudinal side and transverse bottom portions and a relatively wide transverse selvage edge across its top portion, a pocket provided by said selvage edge, said pocket being adapted to receive and having means to removably retain a small treated pad-like element therein, said body parts having cooperating tie piece means extending therebetween across adjacent lengthwise-extending side portions thereof for removably securing them together in a bed covering assembly, said tie piece means being a ribbon secured at one end to the selvage edge of one of said body parts for extending within and along the selvage edges of both of said body parts, and a treated pad-like element carried by said ribbon within the selvage edge of at least one of said body parts.

4,005,500

FINISHING OF TEXTILES

John Rayment, Nottingham, England, assignor to Samuel Pegg & Son Limited, Leicester, England

Filed Mar. 26, 1974, Ser. No. 454,905

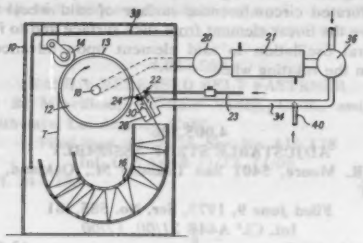
Claims priority, application United Kingdom, Apr. 3, 1973, 15806/73

Int. Cl. B05c 5/00, 9/08

U.S. Cl. 8—149.1 **9 Claims**

1. A process for the treatment of textiles in a finishing stage of manufacture, in which the progress of the textile in a path around a closed circuit within a treatment zone is achieved at least in part firstly by means of an air flow impinging obliquely upon the textile while the textile is being impregnated by a

treatment liquor and then by means of a flow of steam under pressure impinging obliquely upon the impregnated textile



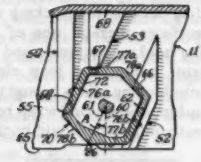
whereby to raise the temperature thereof to the fixing temperature.

4,005,501

MOUNTING MEANS FOR THE ROTATABLE BRUSH ROLL OF A SUCTION CLEANER

Willis E. Berry, Bloomington, Ill., assignor to National Union Electric Corporation, Greenwich, Conn.

Filed May 27, 1975, Ser. No. 580,559
Int. Cl.² A47L 5/30
U.S. Cl. 15—339 **12 Claims**



6. In a suction cleaner including a base having front, rear and laterally spaced side walls, said base having an elongated, laterally extending suction chamber therein, said suction chamber being defined in part by laterally spaced portions of said side walls and a removable sole plate having at least one suction opening therein, the improvement of mounting means for supporting an elongated, rotatable brush roll in said suction chamber and permitting rapid installation in and removal of said brush roll therefrom, said mounting means comprising means defining a seat on the inner surfaces of said suction chamber side wall portions, each seat having a pair of spaced, parallel guide surfaces and stop means for limiting radial inward shifting movement of said bursh roll, and engaging means formed on each end of said brush roll for directly engaging said guide surfaces and said stop means, said guide surfaces and said engaging means coacting so that said engaging means is movable between said guide surfaces in one or the other of two diametrically oppositely oriented positions.

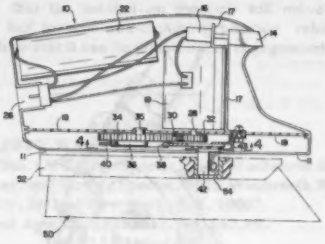
4,005,502

ELECTRIC POWER SCRUBBER

Elaine Stevens (Boyer), 2750 Endicott Road, Shaker Heights, Ohio 44120

Filed Sept. 25, 1975, Ser. No. 616,557
Int. Cl.² A46B 13/02
U.S. Cl. 15—22 R **7 Claims**

1. A power scrubber, which comprises:
a sealed housing;
a motor mounted within the housing having a rotary shaft;
an oscillatory shaft pivotally mounted in the housing, the oscillatory shaft extending from the housing and capable of revolving back and forth in an oscillatory manner;
a generally triangular-shaped brush body mounted on the oscillatory shaft, the brush body having a periphery of outwardly extending angularly disposed bristles about a generally triangularly shaped center of material extending from one side of said brush body and being capable of oscillating pivotally about the revolving oscillatory shaft axis, the said axis extending through said center material; and



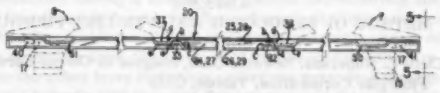
means for oscillating the brush body about the oscillatory shaft axis which includes an eccentric rotatably mounted within the housing and rotated by the rotary shaft and a yoke fitting around the eccentric and producing an oscillatory motion as the eccentric rotates.

4,005,503

WINDSHIELD WIPER BLADE REFILL

John T. Petrick, Newtown, Conn., assignor to Parker-Hanniflin Corporation, Shelton, Conn.

Filed Sept. 26, 1975, Ser. No. 617,013
Int. Cl.² B60S 1/02
U.S. Cl. 15—250.42 **9 Claims**



1. In a windshield wiper blade unit for assembly with a pressure distributing wiper structure that includes blade carrying yoke portions at least one of which is detachable, each said portion having fixed thereto at least one set of claws for receiving and holding slidably the backing member of a wiper blade unit, said blade unit including an elastic wiping element comprising longitudinally extending wiping, neck and head portions and a backing member constituted by an extruded, elastically resilient strip having a longitudinally hollow central portion slotted along its bottom to receive slidably said head portion and said neck portion respectively in the hollow and the slot thereof and presenting along opposite sides thereof upper and lower lateral flanges defining therealong laterally open channels to receive slidably, confine and bear pressure from the ends of said claws, the improvement which comprises at least one of said flanges having a deformation thereof protruding into the channel defined thereby and forming in said channel a claw-abutting ridge at a location proximate to but inwardly of the normal working position therein of a claw of the innermost set of claws on one of said yoke portions, there being at least one said ridge forming deformation in at least one of said channels for limiting sliding movement of said strip relative to a claw of the innermost set of claws of each of said yoke portion, each of said ridge forming deformations being a portion of a said lower flange.

4,005,504

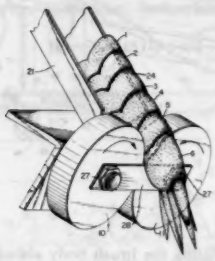
METHOD FOR PARTIALLY PEELING SHRIMP

Fernand S. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.

Division of Ser. No. 454,586, March 25, 1974, abandoned. This application Sept. 5, 1975, Ser. No. 610,676

Int. Cl.² A22C *29/00*

U.S. Cl. 17—48 **1 Claim**



1. The method of peeling only certain desired shell segments from shrimp which have previously had their condyle hinges broken at the 5–6 joint and the backs of their shell segments 1 through 5 cut through comprising:

a. subjecting the shrimp for peeling segments 1 through 5 therefrom to the peeling action of a nip formed between a pair of narrow peeling rolls with peeling forces applied to both sides of the shrimp progressively from shell segments 5 through 1 downwardly in a direction essentially from the dorsal to the ventral side of the shrimp, and

b. simultaneously moving the shrimp lengthwise down an inclined trough past the peeling nip tail end leading while the shell segments 5 through 1 progressively removed from the shrimp wherein said peeling rolls are thinner than the length of said shrimp and the force imparted by the rolls advances the shrimp past the peeling nip.

4,005,505

METHOD OF PRODUCING A SLIVER-LIKE FIBROUS ELEMENT

Cletis L. Roberson, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed May 27, 1975, Ser. No. 581,257

Int. Cl.² D01G *27/00*

U.S. Cl. 19—150 **2 Claims**

1. The method of advancing a linear fibrous element for collection comprising:

advancing a linear fibrous element on the external perforated circumferential surface of a rotating hollow wheel;

introducing a stream of gaseous fluid having a pressure that varies between a bias pressure and a pulse pressure into said hollow wheel; and

directing the stream of gaseous fluid outwardly through the perforated circumferential surface of said wheel to remove the linear element from such surface and to impart lateral oscillation to said element upon advancement from the rotating wheel.

4,005,506

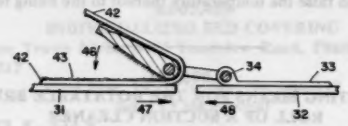
ADJUSTABLE STRAP ASSEMBLY

Robert R. Moore, 5401 San Leandro St., Oakland, Calif. 94601

Filed June 9, 1975, Ser. No. 585,181

Int. Cl.² A44B *21/00, 17/00*

U.S. Cl. 24—68 E **13 Claims**



1. An adjustable strap assembly comprising a buckle, a first strap comprising a length of flexible material adapted to be passed through said buckle, one surface of said strap being provided with a pile fabric having first interlocking elements secured thereto, and a second strap secured at one end to said buckle and including second interlocking element portions secured to both surfaces thereof, one of said interlocking elements comprising hooking elements and the other of said interlocking elements comprising loop elements, said elements releasably interlocking when brought into confronting contiguous relationship, said second strap releasably securing said first strap directly adjacent to said buckle.

4,005,507

SAFETY PUSHPIN

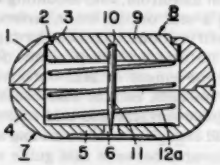
Tadakatsu Yamazaki, No. 802, 1-10-22, Nakameguro, Meguro, Tokyo, Japan

Filed Oct. 23, 1974, Ser. No. 517,432

Claims priority, application Japan, Jan. 16, 1974, 49-7248[U]

Int. Cl.² A44B *9/00*; A44C *5/18*

U.S. Cl. 24—150 R **9 Claims**



1. A safety pushpin that can concurrently serve as a clip, comprising,

a head and pin extending from the central part of said head, said pushpin being housed within a casing comprising an upper shell having a shell top with a large-diameter hole surrounded by an inwardly extending flange and a lower shell having a bottom wall with a small-diameter hole in the center thereof; said head being larger in diameter than the distance across said flange of said large-diameter hole and said pin being passable through said small-diameter hole in the bottom wall of said lower shell, and further characterized in that an oblique space spread out radially toward both upper and lower ends is provided at a suitable part in the juncture of said upper and lower shells, both of said upper and lower shells being joined

together swingable relative to each other so that said oblique space may be closed, and an elastic material is provided between said upper and lower shells to normally keep said oblique space open.

4,005,508

EASILY RELEASED BELT FASTENER

Daniel B. Merrifield, Fountain Valley, Calif., assignor to Healthways, Los Angeles, Calif.

Filed Sept. 24, 1975, Ser. No. 616,128
Int. Cl.² A44B *11/12, 11/06*
U.S. Cl. 24—193 **2 Claims**

1. An easily released belt fastener which comprises:

an elongated body having first and second ends, sides, a top and a bottom, said body also having an opening located therein which extends between said top and said bottom and which is spaced from said sides and said ends,

clamping surface means for use in engaging a strap so as to frictionally hold such a strap, said clamping surface means being located on said body so as to extend generally between said sides along the portion of said opening closest adjacent to said first end,

bearing means for movably mounting a clamping bar located on said body adjacent to said opening and to said clamping surface means, said bearing means comprising bearing openings extending through the top of each side and having an enlarged shaped opening portion in each side,

a clamping bar having ends, said ends being shaped for limited rocking movement in said shaped opening portions and being supported within said bearing means so that said bar is capable of being moved between a non-clamping position parallel to and spaced from said clamping surface means and a clamping position in which said clamping bar is parallel to and closer to said clamping surface means than in said non-clamping position, and,

said clamping bar and said clamping surface means being located adjacent to said top and to said bottom, respectively, so as to have adjacent edges which are capable of being moved relative to one another as said clamping bar is moved between said clamping and said non-clamping positions,

attachment means located on said second end of said body for use in securing said body in an operative position in which said body can be rotated generally about an axis which is substantially parallel with said clamping surface means,

said opening, said clamping bar and said clamping surface means being shaped so that when said clamping bar is in said non-clamping position a belt may be located so as to extend underneath said first end of said body, beneath said bottom, through said opening to said top, around said clamping bar, between said clamping bar and said clamping surface means and then along itself adjacent to said bottom,

said clamping bar being movable in response to tension applied to a belt which is so located so that as tension is applied to such a belt said clamping bar is moved from said non-clamping position to said clamping position, said clamping bar engaging a belt which is so located in said clamping position so as to hold said belt against movement relative to said body,

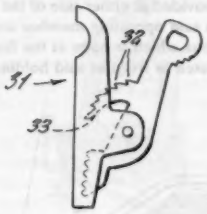
when said body is secured in an operative position by said attachment means said first end of said body being capable of being moved so as to vary the angular relationship between said clamping bar and said body to a sufficient extent so that the tension on the belt will move said clamping bar to said non-clamping position, releasing such a belt so that it can be pulled out of engagement with said body.

4,005,509

JIFFY WASH LINE ADJUSTER

Salvatore Verdina, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

Filed Apr. 14, 1975, Ser. No. 567,492
Int. Cl.² F16G *11/10*
U.S. Cl. 24—133 **1 Claim**



1. In a jiffy wash line adjuster, the combination of a pair of levers having means for pivotally attaching them together at their centers, a pair of corresponding jaws formed at one end of said levers for grasping a clothes line therebetween, and an opposite end of said levers forming handle ends each of which has an opening therethrough, said openings being axially disaligned with each other, one of said levers being of channel construction having a longitudinal central line receiving slot and the other said lever being flat and received within said slot of the other said lever wherein said means comprising a pair of ears extending from the lever of channel construction to receive the other lever including a pivot pin extending through aligned holes in said ears and flat lever spaced from said line receiving slot, wherein the jaw on the flat lever is ratcheted and received fully within the slot of the opposing jaw, said flat lever handle end having a transverse opening for tieing one end of said line, said handle end of the channel lever including an opening to receive the adjustable end of said line, including further means on said flat lever for engaging and forcing the adjustable line in said slot towards and through the jaws responsive to movement of the handles toward each other, said further means gripping said line against the channelled lever, wherein said further means comprises an arcuate projection extending from the flat lever towards the other said lever, wherein said projection curves convexly towards said slot and terminates in substantial axial alignment within the slot, including teeth on the outer periphery of the projection including portions within the slot and portions external to the slot.

4,005,510

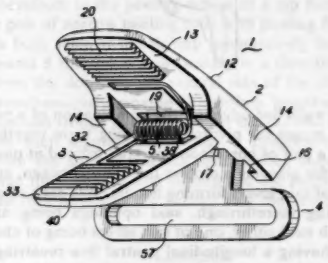
PLASTIC CLIP

Taizo Noda, Nishinomiya, Japan, assignor to Kohshoh Limited, Kyoto, Japan

Filed Mar. 4, 1976, Ser. No. 663,809
Claims priority, application Japan, Oct. 8, 1975, 50-122228
Int. Cl.² A44B *21/00*
U.S. Cl. 24—250 R **10 Claims**

1. A plastic clip comprising upper and lower plate members

each comprising a base plate provided with a jaw at the front end thereof and being pivotally connected to the other, a spring for holding said jaws in open position and an operating member fitted in said two plate members for holding said jaws in closed position, wherein said upper plate member includes an opening provided at the rear of the corresponding base plate, two opposing side plates each connected to the required portion of each side of the base plate, bearings for the operating member each provided at the rear of the inside surface of said side plate and a shaft having at least an arcuate surface and extending between said side plates, wherein said lower plate member, comprising said base plate at least the front end of which is adapted to be inserted between the front edge of the opening of the upper plate member and said shaft, includes an upwardly-extending expanded portion located at the rear end of the base plate, the lower surface of said expanded portion being formed into a bearing adapted to engage said shaft for the desired arrangement of the upper and lower plate members, a projection located behind said expanded portion and having a smaller width than said expanded portion and being adapted to carry the operating member, and a first protrusion being provided at either side of the rear end of said projection wherein said operating member comprises a holding portion and a box which is open at the front and the bottom thereof, is located in front of said holding portion and is



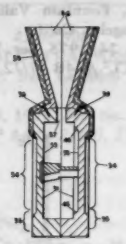
adapted to be inserted between the rear edge of the opening and the projection from under said opening, each outside surface of the side walls of said box being provided with a shaft for said operating member for loosely engaging the corresponding bearing for the operating member, wherein said operating member is inserted between the rear edge of the opening and the projection of the lower plate member from under the opening of the upper plate member when the jaws are in open position, said box being formed so that it has a thickness in excess of the distance between the rear edge of the opening and the projection to prevent downward slippage, and on the other hand when the jaws are in closed position, each of said side walls of the operating member being located between the side edge of the opening and the projection and a rear wall of the same between the rear edge of the opening and the rear end of the projection, said box also being formed so that its top and bottom are in substantially the same plane with the upper surface of the base plate of the upper plate member and the lower surface of the base plate of the lower plate member respectively, and wherein the jaws are brought to closed position by downwardly pressing the rear end of the lower plate member and further kept in the same position, namely in closed position by force substantially parallel to the plate members exerted to the lower portion of the front end of the side wall of the operating member and the upper portion of the outside surface of the rear wall of the same.

4,005,511

METHOD AND APPARATUS FOR CASTING EXTRUSION DIES

Jay H. Muusse, Spring Lake, Mich., assignor to Tuff-Ten Corporation, Sparta, Mich.

Filed July 3, 1975, Ser. No. 593,025
Int. Cl.² B22C 9/08, 9/06, 9/20
U.S. Cl. 29—33 C **28 Claims**



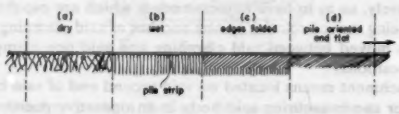
1. A method for casting aluminum extrusion die blanks comprising: providing a mold having spaced side walls joined by a peripheral edge wall to thereby define a disc-like mold cavity, said mold side walls each having a center portion slightly larger in surface area than the area required to form a desired die aperture in the steel disc to be molded, and said mold side walls each including a peripheral portion extending from said center portion to said peripheral edge wall, said mold further including a sprue opening into said cavity at a point spaced from said center portions of said side walls; casting into said mold through said sprue a molten steel of a type suitable for forming aluminum extrusion dies; cooling the mold and the molten steel therein more rapidly at said center portions of both said side walls than at said peripheral portions thereof and more rapidly than at said peripheral edge wall and said sprue of said mold to thereby solidify and steel most rapidly and with the least porosity at the center of the disc being formed in said mold cavity; removing the resulting solid steel disc from said mold and removing the decarburization surface layer of said solid steel disc at least in the center portion of at least one side of said disc.

4,005,512

ELECTROPHOTOGRAPHIC TONER REMOVAL BRUSH AND METHOD OF MAKING SAME

Thomas G. Kandel, 100 E. Hartsdale Ave., Hartsdale, N.Y. 10530

Filed Oct. 23, 1975, Ser. No. 625,051
Int. Cl.² A46B 3/00
U.S. Cl. 29—120 **46 Claims**



1. A method of making an electrophotographic toner removal brush which comprises treating a pile substrate material with a saturated aqueous solution of a first chemical mixture comprising an alkali metal salt and a source of borate ions, withdrawing excess solution therefrom, and simultaneously orienting the pile, allowing the still solution wet pile material to dry, applying the resulting dried pile material to an elongated tubular base core and subjecting said dried pile to further treatment with a saturated aqueous solution of a second chemical mixture comprising two alkali metal salts and a surfactant and finally subjecting said further treated pile material to a centrifugal force sufficient to hurl the pile fibers to an erect condition thereby forming a brush nap wherein the

density of each pile fiber has been increased by rapid centrifugal removal of the solution therefrom and allowing the brush nap to dry.

4,005,513

PINROLL WITH PINSTRIPS

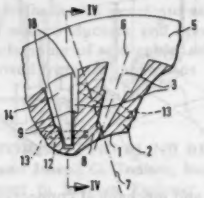
Josef Egerer, Schwabach, Germany, assignor to Firma Staedtler & Uhl, Schwabach, Germany

Filed May 17, 1976, Ser. No. 687,415

Claims priority, application Germany, Mar. 27, 1976, 2613210

Int. Cl.² B21B *1/40*; D01G *19/04*

U.S. Cl. 29—121.5 **12 Claims**



1. A pin roll comprising a roll body, wedge grooves in said roll body disposed parallel to the axis of said roll body, pinstrips disposed in said wedge grooves, clamping wedges disposed in said wedge grooves and holding said pinstrips in said wedge grooves, at least two parallel pegs in said roll body disposed generally transversely of said wedge grooves, said clamping wedges having means defining oblique slots extending from the bottom thereof, said pegs being disposed in said oblique grooves, and operable means operable in a longitudinal direction and engageable with said wedges means to effect securing and releasing of said pinstrips.

4,005,514

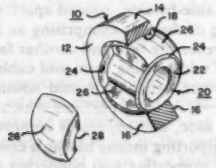
SPHERICAL BEARING ASSEMBLY

Albert R. McCloskey, Fairfield, Conn., assignor to The Heim Universal Company, Fairfield, Conn.

Division of Ser. No. 434,934, Jan. 21, 1974, Pat. No. 3,893,736. This application Feb. 28, 1975, Ser. No. 554,282

Int. Cl.² B21D *53/10*

U.S. Cl. 29—149.5 B **1 Claim**



1. A method of assembling a spherical bearing assembly having an outer race member with a cylindrical outer surface, a spherical inner surface and lateral surfaces connecting the outer and inner surfaces, and having an inner member fitted within the spherical inner surface of the outer member and the inner member extending laterally beyond the lateral surfaces of the outer member and the inner member having a spool with spherical segments mounted on the spool, comprising the steps of placing a spool member having two annular lips with spherical extremities, one lip at each remote end of said spool member within an area defined by the concave spherical inner surface of an outer member of a spherical bearing, holding the spool member and the outer member misaligned with portions of the spherical extremities of the spool bearing against the inner spherical surface of the outer member and with respective axes of the spool and outer member aligned at 90°, inserting at least three spherical segments on said spool member in such a manner as to form in continuation of the spherical spool lip extremities a spherical inner member of a spherical bearing assembly having a convex spherical outer surface, rotating the assembled spherical inner member into an operational position with respect to the other member.

4,005,515

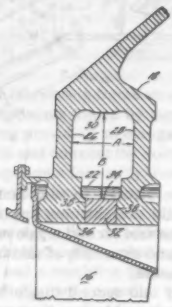
METHOD OF MANUFACTURING A CLOSED CHANNEL DISK FOR A GAS TURBINE ENGINE

Cornelius V. Sundt, Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 554,806, March 3, 1975, Pat. No. 3,970,412. This application Mar. 11, 1976, Ser. No. 666,111

Int. Cl.² B23P *15/04*, *13/00*

U.S. Cl. 29—156.8 R **3 Claims**



1. A method for making a fan disk for a turbofan engine comprising the steps of:

machining a circumferential channel into the outer periphery of a disk shaped member to form an element having an upstream web and a downstream web;

disposing a plurality of arcuate plugs, each of which has an inner circumferential surface, into the channel in end to end relationship to form a toroidal type structure having a substantially rectangular cross section;

attaching the arcuate plugs to the upstream and downstream web at the periphery of the disk; and

machining a plurality of slots across the periphery of the disk through the upstream and downstream webs and through one or more arcuate plugs disposed therebetween, the most radially inward portion of each slot extending below the inner circumference of the plug.

4,005,516

HAND TOOL HAVING DOUBLE TOGGLE LINKAGE

Johannes Cornelis Wilhelmus Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 15, 1976, Ser. No. 666,553

Int. Cl.² H01R *43/04*

U.S. Cl. 29—749 **11 Claims**

1. A plier-type hand tool comprising:

a frame having first and second fixed jaws extending cantilever fashion therefrom and an integral handle extending therefrom, said integral handle being in alignment with said second jaw, said first and second jaws being separated by a gap for reception of a workpiece,

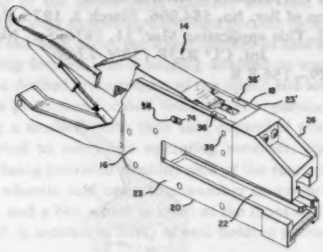
a ram slidably mounted in said first jaw for movement towards and away from said second jaw,

first and second toggle mechanisms, each of said toggle mechanisms comprising two links connected to each other at a knee joint, said first toggle mechanism being in said first jaw and being pivotally connected at one end

thereof to said ram and at the other end thereof to said first jaw, said first toggle mechanism extending transversely of said first jaw when in a straightened condition,

a straightening link, said straightening link being pivotally connected at one end thereof to said knee joint of said first toggle mechanism and extending from said knee joint towards said frame,

said second toggle mechanism being pivotally connected at one end thereof to said straightening link and being pivotally connected to said frame at the other end thereof, said second toggle mechanism extending in the direction of said first jaw when in a straightened condition,



a movable handle pivoted to said first jaw at a location proximate to said straightening link and extending from said first jaw past said second toggle mechanism, past said frame portion, and externally of said frame portion beside said integral handle,

said knee joint of said second toggle being pivotally connected to said movable handle intermediate the ends thereof whereby

upon movement of said movable handle towards said fixed handle when said first and second toggle mechanisms are broken, said second toggle mechanism is straightened and said straightening link is driven towards said first toggle whereby said first toggle mechanism is straightened and said ram is moved towards said second jaw.

4,005,517

VACUUM CLEANER HOSE TERMINAL APPLICATOR

Raymond Arthur Coulter, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed June 23, 1975, Ser. No. 589,238
Int. Cl.² H01R *43/00*
U.S. Cl. 29—748 **17 Claims**

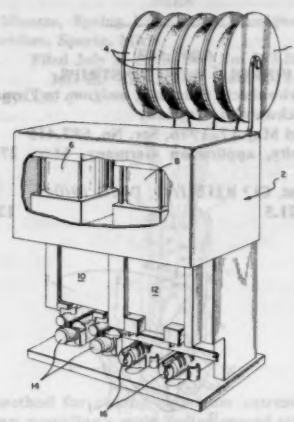
1. Apparatus for attaching a terminal having a wire receiving portion to a helical wire; said apparatus comprising:

a generally cylindrical horn for supporting a portion of said wire on the exterior surface of said cylindrical horn with said wire in surrounding relationship to said cylindrical horn,

a terminal support surface on said cylindrical horn, said terminal support surface being located radially within said exterior surface,

terminal positioning means for positioning one of said terminals on said terminal support surface with said wire receiving portion in alignment with said portion of said wire, and

moveable wire insertion means moveable towards and away from said terminal support surface, said wire insertion means moving in a radial direction past said exterior surface of said cylindrical horn to flex said portion of said wire radially inward into said wire receiving portion, whereby



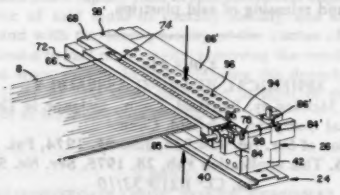
an electrical and mechanical connection between said terminal and said wire is achieved.

4,005,518

APPARATUS FOR CONNECTING CONDUCTORS IN FLAT CABLE TO TERMINALS IN A CONNECTOR

Johannes Cornelis Wilhelmus Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 15, 1976, Ser. No. 666,552
Int. Cl.² H01R *43/04*
U.S. Cl. 29—752 **9 Claims**



1. Apparatus for installing a multi-contact connector on a flat multi-conductor cable of the type having a plurality of conductors in side-by-side spaced-apart relationship, said connector being of the type comprising an insulating housing having a cable-receiving face and another face which is on the opposite side of said housing from said cable-receiving face, a plurality of contact terminals in said housing, said terminals having conductor-receiving portions which extend from said cable-receiving face, said apparatus comprising:

connector supporting means having a connector supporting surface for supporting said connector on said other face thereof,

cable supporting means having a cable supporting surface,

said connector supporting means and said cable supporting means being assembled to each other with said connector supporting surface extending parallel to, and beside, said cable supporting surface, said surfaces being offset from each other by a distance such that the free ends of terminals extending from a connector supported on said connector supporting surface are proximate to the plane defined by said cable supporting surface,

compressible resilient means interposed between said cable supporting means and said connector supporting means,

clamping means for clamping said cable against said cable supporting means with a portion of said cable extending in said plane of said cable supporting surface past a con-

nector supported on said connector supporting means and,

removable pressure transmitting plate means disposed beside said cable supporting surface and in alignment with a connector supported on said connector supporting means, said pressure transmitting plate means having terminal-receiving openings extending therethrough which are in alignment with said terminals in said connector whereby,

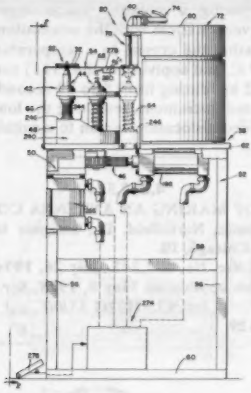
upon positioning a connector upon said connector supporting surface and clamping said cable against said cable supporting surface by said clamping means, positioning said pressure transmitting plate means beside said cable supporting surface and applying pressure against said pressure transmitting plate means, said cable will be moved relatively towards said cablereceiving face of said connector and said conductor-receiving portions of said terminals will penetrate said cable and establish contact with said conductors, and upon removal of said pressure, and unclamping of said cable, said connector and cable can be removed from said apparatus.

4,005,519

APPARATUS FOR SETTING BLIND RIVETS

Anthony E. Di Maio, and Joseph G. Todisco, both of Georgetown, Mass., assignors to Marson Fastener Corporation, Chelsea, Mass.

Filed May 28, 1975, Ser. No. 581,954
Int. Cl.² B23Q 7/10
U.S. Cl. 29—818 **14 Claims**



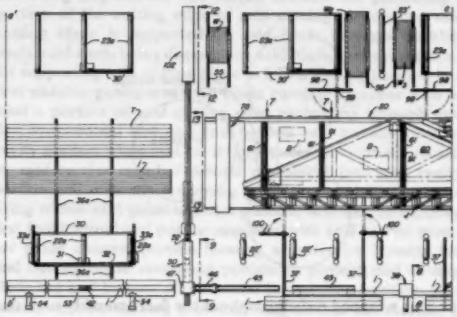
1. An apparatus particularly adapted for use in enabling the continuous setting of blind rivets having rivet mandrels or the like in suitably apertured material comprising support means; feed means operatively connected to the support means for selectively feeding individual rivets to a loading station; carriage means operatively connected to the support means including rivet holding assembly means for receiving respective ones of the rivets and being selectively and incrementally advanced from at least a loading station, to a working station, and back again to the loading station; drive means operatively connected to the carriage means for successively advancing the rivet holding assembly means from at least the loading station to the working station, and back again to the loading station; motion producing means for imparting predetermined generally vertical displacement to each of the riveting holding assembly means in response to movement of the holding assembly means between at least the loading and working stations, and rivet setting means for vertically displacing respective ones of the rivet mandrels operatively held by said holding assembly means for thereby setting the rivet in the material.

4,005,520

FRAME STRUCTURE FABRICATING SYSTEM

Arthur Carol Sanford, 2308 Bay Drive, Hillsboro Shores, Pompano Beach, Fla. 33062

Filed Mar. 9, 1976, Ser. No. 665,251
Int. Cl.² B23P 11/00
U.S. Cl. 29—432 **18 Claims**



1. The method of fabricating frame structures having wood chord and web components joined by metal toothed connector plates, comprising providing an elongated rectangular bed on which to assemble and connect the components, conveying bundles of like components forwardly toward the sides of the bed in directions longitudinally thereof, transferring certain components laterally to stacking areas adjacent to the ends of the bed, conveying certain other components to stacking areas adjacent to the sides of the bed, selecting components from said stacking areas and assembling them on the bed to form frame structures with toothed connector plates at the top and bottom of the joints, partly embedding the teeth of said plates by passing a pair of pinch rolls longitudinally over and under said bed, transferring the frame structures laterally off opposite sides of the bed onto longitudinal rows of conveyor rolls, and moving said structures over said rolls rearwardly away from the bed and through stationary pinch rolls to fully embed the teeth of the connector plates.

7. Apparatus for continuously assembling, fabricating and stacking frame structures having wood chord and web components joined by toothed metal connector plates comprising an elongated rectangular jig bed, longitudinal rows of conveyor rolls on opposite sides of said bed and extending beyond the bed to define a storage area therebetween, said conveyor rolls adapted to convey components forwardly to the bed and assembled structures rearwardly from the bed, first transfer means associated with certain of said conveyor rolls for transferring chord components laterally inward adjacent to the ends of the bed, means on the bed to hold the components and connector plates in assembled relation, pinch rolls movably supported for rolling over said bed to partially embed the teeth of the connector plates, second transfer means at opposite sides of the bed to transfer the assembled frame structures onto the rows of conveyor rolls for conveyance rearwardly from the bed, and third transfer means adjacent each row of conveyor rolls at the storage area to transfer the assembled structures laterally and support them in stacked relation in the storage area.

4,005,521

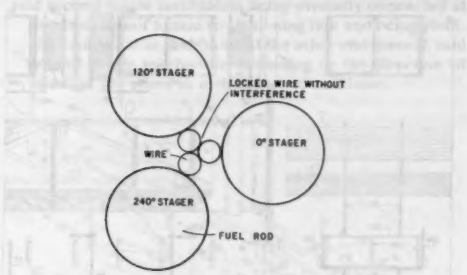
LOCKED-WRAP FUEL ROD

Samuel Kaplan, Los Gatos; Alan J. Chertock, San Francisco, and James R. Punches, San Jose, all of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 17, 1975, Ser. No. 587,800
Int. Cl.² G21C 21/02, 3/12
U.S. Cl. 29—469 **1 Claim**

1. A method for wire-wrap spacing nuclear fuel rods for a

fuel assembly containing a plurality of fuel rods in a triangular pitch array comprising the steps of: wrapping wire about each of the fuel rods in a helical pattern by using a wire of a diameter ranging from 0.035 to 0.053 inch such that a rod pitch to wire diameter ratio in the range of about 1.15 to about 1.30 can be maintained without wire-to-wire interference caused by overlapping of wires on adjacent fuel rods, and positioning



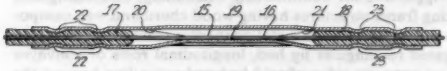
the thus wrapped rods throughout the fuel assembly such that the groupings of three rods in any triangular pitch array will contain three different start positions of the wire wrapping by placing the groupings of three rods in 0°-120°-240° orientations and such that the wire wrapping of adjacent rods forms a non-overlapping wire-to-wire contact forming a lock-wrap design tending to lock the rods together at each wire-wrap cluster.

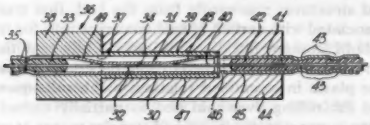
4,005,522

METHOD OF CONNECTING TWO OPTICAL FIBRES IN END TO END RELATIONSHIP

Jack Frank Dalgleish, Ottawa, and Helmut Hans Lukas, Carleton Place, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Division of Ser. No. 549,661, Feb. 13, 1975, Pat. No. 3,972,585. This application Apr. 5, 1976, Ser. No. 673,366
Int. Cl.² B21D *39/00*; B23P *11/00*
U.S. Cl. 29—517 **4 Claims**





1. A method of connecting two coated optical fibres in end to end relationship, comprising:

preforming a section of a tubular connecting member by radially inwardly deforming said section to form a central bore a close sliding fit on an uncoated fibre;

inserting a first coated fibre at one end of said tubular connecting member, the uncoated fibre extending into said central bore;

crimping said tubular connecting member onto said first coated fibre;

inserting the uncoated fibre of a second coated optical fibre into said central body in end to end relationship with said first fibre.

4. A method as claimed in claim 1, including inserting said second coated fibre into a second tubular member, the uncoated fibre of said second coated fibre extending from one end of said second tubular member;

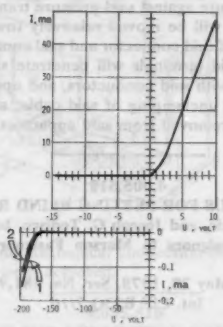
crimping said second tubular member on said second coated fibre, and holding said first and second tubular members in axial relationship.

4,005,523

SEMICONDUCTOR DEVICES

Samson Khaim Milshtein, 84/33 Hantke St., Jerusalem, Israel

Filed Sept. 9, 1975, Ser. No. 611,801
Claims priority, application Israel, Apr. 9, 1975, 47059
Int. Cl.² B01J *17/00*
U.S. Cl. 29—581 **10 Claims**



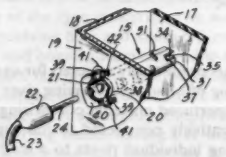
1. A process for the production of p-n junctions which comprises preparing a suitable silicon type-n crystal of 100Ω/cm to several KΩ/cm with the orientation (111), (112) and (110), heating the crystal to a temperature of between 700° and 800 ° C, and applying to the (111) surface a load of from 0.5 to 1.2 kg. during from 5 to 50 seconds by means of a suitable pointed instrument, removing the load and welding the thus produced dislocation region to a suitable conductor.

4,005,524

METHOD OF MAKING AN ANTENNA CONNECTOR

Ronald L. Schultz, Northfield, Ill., assignor to Chromalloy-Alcon, Inc., Chicago, Ill.

Division of Ser. No. 492,242, July 26, 1974, Pat. No. 3,936,120. This application May 8, 1975, Ser. No. 575,729
Int. Cl.³ H02G *15/00*
U.S. Cl. 29—629 **11 Claims**



1. A method of making an electrical connector especially suitable for coupling an antenna leadin with a printed circuit board and a receiver chassis, comprising:

bending an originally flat sheet metal blank about a cylinder axis into a tubular form body and bringing longitudinal edges of the blank into confronting edge-to-edge relation along a longitudinal joint;

forming on opposite ends of said body means for mounting it in functioning position;

assembling within said body a dielectric support carrying an electrical contact in electrically insulated relation at a location within the body spaced from one end of the body and providing an opening into a plug-receiving socket

defined by the body between said one end and said support;

deforming material of the blank into engagement with the dielectric support and thereby mechanically interlocking the dielectric support to the body; and

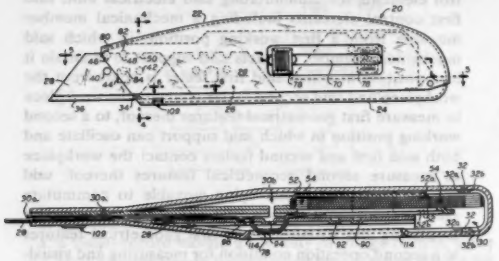
effecting substantial retention of the body against spreading open at said joint contiguous to said support by said deforming material of the blank, but leaving the joint from the support entirely to said one end of the body free to expand when an oversize plug is inserted into the socket.

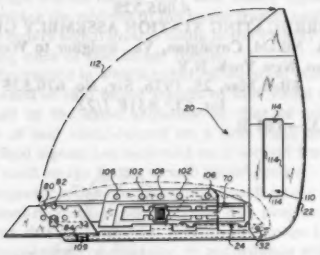
4,005,525

RETRACTABLE CUTTING IMPLEMENT

Donald Gringer, Bedford, N.Y., assignor to Allway Tools Inc., Bronx, N.Y.

Filed Aug. 29, 1975, Ser. No. 608,971
Int. Cl.² B26B *1/08, 5/00*
U.S. Cl. 30—125 **18 Claims**





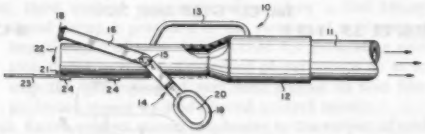
1. A retractable cutting implement comprising a sleeve-like handle member, said handle member having a cavity portion comprising a first longitudinal slot, said handle member being open on the base thereof through said first slot and at one end of said first slot; a carrier member pivotally mounted to said hollow sleeve-like handle member at the other end thereof opposite from said one end for pivotal movement into and out of said cavity portion between a closed position and an open position for said implement, said carrier member resiliently holding within said cavity carrier member when said carrier member is pivotally moved into said cavity portion for substantially closing said cavity portion, said carrier member having a longitudinal extent substantially equivalent to said handle member longitudinal extent and comprising a substantially enclosed longitudinally extending chamber with a passage therein in communication with said one end of said first slot in said handle member; and a blade carriage member slidably mountable in said carrier member chamber for slidable movement toward and away from said passage, said blade carriage member having a plurality of studs at the end thereof opposite said pivotally mounted end of said carrier adapted to support a perforated cutting blade having a top edge and a bottom edge for slidable movement of said blade into and out of said first slot one end through said passage when said implement is in said closed position, at least one of said blade edges comprising a cutting edge, said carrier member opposite end having an inner edge completely pivotally insertable within said handle member cavity portion first longitudinal slot and an outer edge, said outer edge having a guide channel portion and being disposed on said carrier member for protecting a portion of the cutting edge of said cutting blade when said cutting blade is supported on said blade carriage member studs, said studs being disposed on said blade carriage member for supporting said cutting blade in a first cutting position in a first slidable position of said blade carriage member with at least a portion of said cutting edge protruding through said first longitudinal slot one end beyond said handle member cavity portion when said cavity portion is substantially closed by said carrier member pivotal movement into said cavity portion and with the remaining portion of said cutting edge being within said guide channel portion, said handle member first longitudinal slot portion together with said carrier member guide channel portion forming a protective housing for said cutting blade remaining portion to protect said cutting blade top and bottom edges in said first cutting position, said handle member having a second longitudinal slit therein, a button being disposed on said blade carriage member and extending through said chamber and into said second longitudinal slit in said closed position of said implement with said button being movable along said second slit when said blade carriage member slides within said chamber, said movement of said button effectuating said slidable movement of said blade carriage member, said second slit having a longitudinal extent sufficient to enable said slidable movement of said supported cutting blade between said first cutting position and a second retracted position of said cutting blade within said cutting implement, said cutting edge being enclosed with said cutting implement in said retracted position with said implement in said closed position thereof, whereby the remaining portion of said cutting edge of said supported cutting blade is substantially prevented from dulling in said first cutting position and substantially the entire cutting edge of said supported blade is protected in said retracted position.

4,005,526

VACUUM HAIR CUTTER

Scott Douglas Clay, P.O. Box 326, Monticello, Miss. 39654

Filed Aug. 27, 1975, Ser. No. 608,100
Int. Cl.² B26B *19/44*
U.S. Cl. 30—133 **2 Claims**



1. In a vacuum hair cutter, the combination of a scissors-like implement attachable to a hose of a vacuum cleaner or other vacuum source, said scissors-like implement comprising a tube and a frame-like lever pivotally attached together at their approximately longitudinal centers, and said lever carrying a replaceable safety razor blade movable transversely across a first end of said tube, for cutting hair that is vacuum pulled into said tube, said tube being made of a soft, unbreakable polymeric plastic material, and having a diametrical size at a second opposite end thereof, suitable for connection to said vacuum cleaner hose, said first end of said tube being of a smaller diameter than said second opposite end, a ring integral with an outer side of said tube being adaptable for receiving fingers of a person's hand operating said vacuum hair cutter, said lever comprising a pair of parallel, spaced-apart side legs positioned adjacent diametrically opposite sides of said tube, a forward end of said legs being interconnected by a transverse

extending portion, said transverse extending portion carrying said replaceable safety razor blade, and opposite, rearward end of said legs each being sidewardly offset toward each other, forming a common handle having a thumb loop therethrough.

4,005,527

DEPTH GAUGE

Ralph S. Wilson, 2324 Ada Court, NE., Albuquerque, N. Mex. 87106, and Charles E. Albright, 6629 Hensch NE., Albuquerque, N. Mex. 87109

Filed Dec. 22, 1975, Ser. No. 643,307
Int. Cl.² G01B *3/04, 3/28*
U.S. Cl. 33—111 **9 Claims**

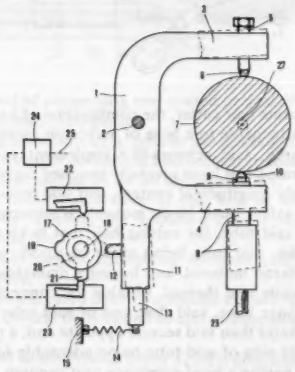
1. A gauge for measuring the depth of a hole, comprising:
a plurality of elongated sections of material opaque to X-rays, each of known length dimension, and
a plurality of elongated sections of material transparent to X-rays, each of known length dimension,
said X-ray transparent sections being alternatingly carried with respect to said X-ray opaque sections, whereby when the depth gauge is inserted into the hole, the depth of which is to be measured, it can be viewed with X-ray techniques from any angle, the dimensions of the X-ray opaque sections and the X-ray transparent sections presenting an indication of the depth to which it is inserted by said X-ray opaque and transparent sections and further comprising an elongated sleeve into the interior of which said X-ray opaque sections and said X-ray transparent sections are implaced.

4,005,528

MEASURING DEVICE FOR GAUGING MECHANICAL PIECES IN PARTICULAR PIECES INCLUDING ROTATION SURFACES

Gastone Albertazzi, Bologna, Italy, assignor to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy

Continuation of Ser. No. 363,258, May 23, 1973. This application Jan. 14, 1975, Ser. No. 540,888
Claims priority, application Italy, May 23, 1972, 3436/72
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² G01B *5/08, 5/20*
U.S. Cl. 33—143 F **6 Claims**



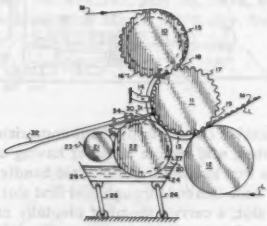
5. A measuring device for checking mechanical workpieces supported to rotate about a determined fixed axis, comprising:
mounting means defining a fixed rotational axis parallel to the rotational axis of the workpiece to be checked; a support mounted on said mounting means rotatable about the rotational axis defined by said mounting means, said support comprising a first arm and a second arm arranged at opposite sides of said rotational axis defined by said mounting means; a first feeler fixed on said first arm of said support;
a measuring head fixed on said second arm of said support and comprising a movable second feeler aligned with said first feeler along a line substantially intersecting the rotational axis of the workpiece, said line being substantially perpendicular to the plane defined by said determined fixed axis and fixed rotational axis; resilient means coupled to said support for urging said first feeler against the workpiece; an electrical unit connected to said measuring head for detecting and visualizing the measurements made; and
commutation and reference means comprising first control elements for commutating said support and second control elements for commutating said electrical unit; said first control elements including a mechanical member movable from a first working position, in which said mechanical member contacts said support to maintain it in a position in which said first feeler is apart from the workpiece and said second feeler contacts the workpiece to measure first geometrical features tnereof, to a second working position in which said support can oscillate and both said first and second feelers contact the workpiece to measure second geometrical features thereof; said second control elements being movable to commutate said electrical unit from a first operating condition for measuring and visualizing said first geometrical features to a second operation condition for measuring and visualizing said second geometrical features.

4,005,529

CORRUGATING STATION ASSEMBLY GUIDE

Willem A. Nikkel, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Mar. 25, 1976, Ser. No. 670,535
Int. Cl.² B31F *1/22*
U.S. Cl. 33—181 R **5 Claims**



1. A method of meshing glue application roll relief grooves with corresponding corrugating roll stripper fingers comprising the steps of:
A. Providing a structural member having a leading edge and at least one planar surface parallel with said edge;
B. Providing slots in said leading edge of sliding fit width relative to a corresponding stripper finger web width, the depth of said slots being normal to said leading edge;
C. Providing structural projections from said planar surface of sliding fit width relative to a corresponding relief groove width, said projections being in parallel alignment with the depth of said slots;
D. Positioning said structural member tangentially against said applicator roll with said stripper fingers meshed with said slots and said projections meshed with said grooves; and

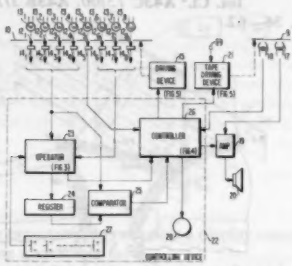
E. Moving said applicator roll into operative proximity with said corrugating roll.

4,065,530

AUDIO-VISUAL TRAINING DEVICE WITH SELECTIVE BRANCHING

Bunzo Takahashi, Akishima; Hiroshi Tachibana, and Minoru Otake, both of Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 433,414, Jan. 8, 1974, abandoned. This application Feb. 18, 1975, Ser. No. 550,487
Claims priority, application Japan, Jan. 8, 1973, 48-4739
Int. Cl.² G09B 7/04
U.S. Cl. 35—8 A **1 Claim**



1. An audio-visual training device comprising:

a. a visual-record having a plurality of image frames, some of said image frames having a first binary signal groups for instruction purposes and second binary signal groups representing the address of the image frame and others of said image frames having only said binary signal groups representing the address of the image frame, said first and second binary signal groups being in the vicinity of corresponding ones of said image frames,

b. an audio-record in which audio information corresponding to each of said image frames of said visual record is recorded in the same sequence as that of said image frames of said visual-record on a first track and image frame feed signals are recorded on a second track at the end of each image frame of said visual record,

c. film projector means for presenting each image frame of said visual-record to a student, said film projector means including driving means for feeding the image frames of said visual-record one-by-one, in accordance with a feed signal, and in a forward or reverse direction, in accordance with an image frame drive direction signal, and first and second detecting means provided in said film projector means for reading said first and second binary signal groups, respectively, in the vicinity of each said image frame of said visual record,

d. audio-record player means including an audio circuit for presenting said audio information recorded on said first track of said audio-record to the student, and for reproducing said image frame feed signals recorded on said second track of said audio-record, said audio-record reproducing means further including driving means for running said audio-record in the forward direction at the play-back speed of said audio information, for stopping the running of said audio-record and for running said audio-record at a higher speed than said play-back speed in the forward or reverse directions in accordance with a play-back signal, a stop signal, a high speed forward drive signal and a high speed reverse drive signal, respectively, and

e. controlling means connected to receive the outputs of said first and second detecting means in said film projector means and the reproduced image frame feed signals from said audio-record player means for generating said feed signal and image frame drive direction signal supplied to said film projector means and said play-back signal, said stop signal, said high speed forward drive signal, and said high speed reverse signal supplied to said audio-record player means, said controlling means comprising:

i. push button means having a plurality of push buttons for entering the reactions or selections of the student from answer choices provided in said image frame of said visual-record presented to the student by said projector means,

ii. operator means connected to receive the outputs from said push button means, and said first and second binary signal groups from said first and second detector means respectively, and including first computing means for computing from said first binary signal group and the outputs of said push button means level signals corresponding to the level of the entry or selection made by the student and second computing means for computing from said second binary signal group and said level signals the address of the image frame of said visual-record to be accessed next and generating signals corresponding to the feed direction of said image frame to be accessed,

iii. register means connected to said second computing means for storing the computed address of the image frame to be accessed next,

iv. comparator means connected to receive the output signals from said second detector means and to receive the computed address stored in said register means for comparing the address stored in said register means and the output signals from said second detector means when said visual-record is fed by said film projector driving means, and generating an output pulse when the outputs of said second detector means agree with said address stored in said register means,

v. first control means for causing the first image frame of said visual-record and the corresponding audio information of said audio-record to be presented to the student when power is turned on,

vi. second control means connected to receive said reproduced image frame signals from said audio-record player means for generating said feed signal to said film projector means to advance said image frames one-by-one in response to the image frame feed signals reproduced from said sound track of said audio-record when no first binary signal group is provided in the vicinity of a presented image frame of said visual-record,

vii. third control means operative when a first binary signal group is provided in the vicinity of a presented image frame of said visual-record for generating said stop signal to said audio-record player means so as to stop the generating of said feed signals to said film projector means by said second control means,

viii. fourth control means responsive to the output of said push button means when it is operated by the student, to said feed direction signals from said second computing means, to said output of said comparator means and to said image frame feed signals for first generating from the outputs of said push button means a feed signal to said film projector means to advance said visual-record in a forward direction one image frame in order to regain synchronization between said audio-record and said visual-record and, if there is an output pulse from said comparator means, then generating a reset pulse to said register means and presenting the next image frame and corresponding audio information to the student, but if there is an output pulse from said comparator means when said visual-record is advanced in a forward direction one image to regain synchronization between said audio-record and said visual-record, then generating a feed signal, in response to the reproduced image frame feed signals, and an image frame

drive direction signal to said film projector means and, until an output pulse is received from said comparator means, generating said high speed forward drive signal or said high speed reverse drive signal according to said image frame drive direction signal,

ix. fifth control means responsive to an output pulse from said comparator means, to said feed direction signals from said second computing means and to said reproduced image frame feed signals for first generating a reset signal to said register means and generating a stop signal to said audio-record player means immediately if the drive is in the forward direction and after receiving an image frame feed signal if the drive is in the reverse direction, and then generating a play-back signal to said audio-record playing means, and

x. sixth control means responsive to said fourth control means for inhibiting the presenting of said audio information recorded on said first track of said audio-record while either said high speed forward or reverse drive signals are connected.

4,005,531

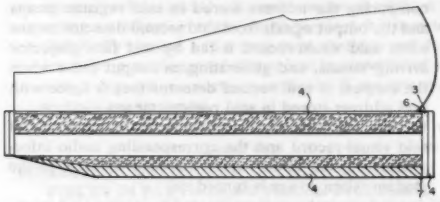
FOOT COOLER

Morton Weintraub, 1542 47th St., and Bernard Gendelman, 1340 52nd St., both of Brooklyn, N.Y. 11219

Filed Aug. 11, 1975, Ser. No. 603,663

Int. Cl.² A43B *13/18, 13/38*

U.S. Cl. 36—28 **1 Claim**



1. A pair of cool shoes comprising: a high platform outer sole specially insulated within and specially constructed with a vacant chamber, which said chamber houses a durable, lightweight, removable container, which said container contains a chilly refrigerant that absorbs the heat transfer from the user's feet and passes it on down through the insufficiently insulated inner sole separating the user's feet from the cool container, to the chilly refrigerant contained within the said container.

4,005,532

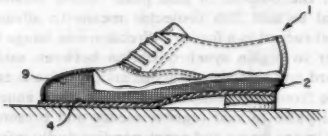
INSULATED INSOLE CONSTRUCTION

Erik O. Giese, Key Biscayne, Fla., and Alexander Louis Gross, Aspen, Colo., assignors to Comfort Products, Inc., Aspen, Colo.

Filed Aug. 20, 1975, Ser. No. 606,223

Int. Cl.² A43B *13/38*

U.S. Cl. 36—44 **4 Claims**



1. An insulated insole construction having a toe, arch and heel area adapted to be included in a shoe comprising, a layer of plastic mesh material shaped to include an insole portion conforming to the inner sole of a shoe where the plastic mesh material comprises a mesh-like plastic first fabric, a mesh-like plastic second fabric spaced from said first fabric, a corrugated plastic separating material extending between and joining said first and second fabrics, a first plastic film overlying said first fabric and a second plastic film overlying said second fabric with said first and second plastic films being sealed together around their edges to hermetically encase said first and second fabrics and separating material to form a noncollapsible insulating chamber therebetween.

4,005,533

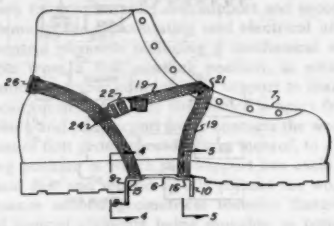
INSTEP CRAMPONS

Gordon K. Anderson, 14632 Pacific St., and Steven M. Leuck, 14801 Briarcliff Place, both of Tustin, Calif. 92680

Filed Nov. 7, 1975, Ser. No. 629,770

Int. Cl.² A43C *15/00*; A43B *3/18*

U.S. Cl. 36—62 **1 Claim**



1. An instep crampon for footwear in general of the kind described, comprizing a substantially channel shaped metallic plate, of a width appropriate to the instep of a boot or shoe, stamped and formed to size having a plurality of downward depending spikes of varying height on front and rear legs of the channel, with multiple spaced parallel slots upset from the edge to provide for attachment of a plurality of flexible straps including front and rear straps, slidably connected to the said plate through the parallel slots the front strap attaching to the footwear around the instep over the arch of the foot and fastened releaseably to a slidable attachment connected to the rear strap which is attached to the plate in like manner and embraces the perifery of the heel to provide support for the front strap arrangement.

4,005,534

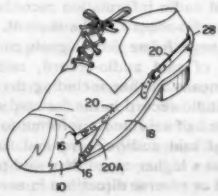
SHOE PROTECTION DEVICE

Harold Crist, and Robert A. Crist, both of Arbovale, W. Va., assignors to The Raymond Lee Organization, Inc., a part interest

Filed Jan. 2, 1976, Ser. No. 646,283

Int. Cl.² A43B *13/22*

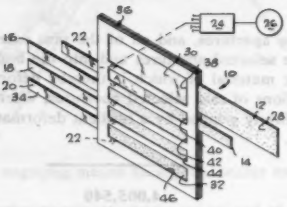
U.S. Cl. 36—72 R **3 Claims**



1. A protection device for a shoe, said device comprising: a hollow metal member having the external shape of a shoe tip and having an internal chamber of like shape communicating with a rear opening in the member, the member having a bottom of a first uniform thickness;

an even plurality of strap receiving loops secured to the outer surface of the two opposite sides of the member and extending outwardly therefrom, half of said plurality of loops being secured to one side, the remaining half of said loops being secured to the opposite side, said loops being located along the periphery of said opening and lying in a common vertical plane located at right angles to the longitudinal axis of said member.

4,005,535
PROGRESSIVELY REVEALED DISPLAY
James F. Davis, 17154 Nordhoff St., Northridge, Calif. 91324
Filed Apr. 11, 1974, Ser. No. 459,928
Int. Cl.² G09F 11/00
U.S. Cl. 40—30 15 Claims

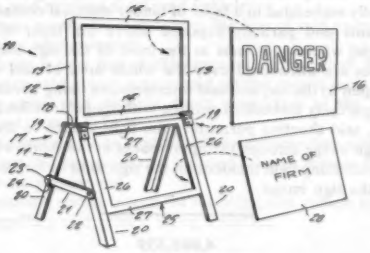


1. A device for progressively revealing a display comprising:
a display having a viewable face;
a stationary mask defining viewable areas of said face;
first and second movable masks, each said movable mask having an opaque area and a clear area selectively positioned in front of the viewable face of said display, each said mask being movable across the face of said display, said masks being positioned adjacent each other and movable to cover and reveal adjacent portions of said display; and
means connected to said movable masks for moving each said mask from a position wherein said opaque portion of each said mask is in front of said display, across said face so that said clear portion of said mask is in front of said face of said display so that said display is progressively revealed, said means for moving said mask comprising means for sequentially moving said first mask while said second mask is substantially stationary so that said first mask first progressively reveals a first one of said viewable areas of said display, and then moving said second mask while said first mask is substantially stationary so that said second mask progressively reveals a second one of said viewable areas of said display.

4,005,536
CHANGEABLE DISPLAY APPARATUS
Samuel Plato Fanning, Jr., Jackson, Miss., assignor to National Advertising Company, Bedford Park, Ill.
Filed Aug. 19, 1975, Ser. No. 605,803
Int. Cl.² G09F 11/02
U.S. Cl. 40—104.02 6 Claims

1. Changeable display apparatus comprising:
a frame;
a plurality of substantially flat display character members;
a hinge assembly rigidly mounted to one end of said display character members;
means for mounting said hinge assembly to said frame for changeably displaying said display characters thereon;
said hinge assembly including, a rod;
a plurality of hollow cylindrical members rotatably mounted immediately adjacent each other on said rod;
a plurality of flanges having one end extending respectively from the perimeter of each of said cylindrical members;
a mounting portion extending outwardly from the other end of each of said flanges;
means for mounting a respective one of said display character members to each of said mounting portions;
said mounting portions of each of said flanges disposed substantially parallel to each other on said rod so that said display character members mounted thereto lie substantially flat on said frame;
latching means mounted on said frame for selectively unlatching and rotating desired display character members on said hinge assembly for changing said display and for clamping said display characters in display position on said frame;
said latching means including a pair of latching arms pivotally mounted to said frame on each side of said hinge assembly and immediately adjacent the other end of said display character members for urging said display character members against said frame, and means for selectively clamping said latching arms to said frame to maintain said display character members in display position on said frame; and
a pair of latching tabs pivotally mounted on said frame on each side of said hinge assembly intermediate said respective latching arms, and means for respectively simultaneously pivoting respective pairs of said latching arms and tabs during changing of said display.

4,005,537
FOLD-A-BOARD
Peter A. von Camber, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007
Filed Mar. 11, 1975, Ser. No. 557,279
Int. Cl.² G09F 7/18
U.S. Cl. 40—125 H 2 Claims



1. In a fold-a-board, the combination of a foldable framework for standing on a ground surface and an upper frame secured symmetrically thereupon for holding a first sign panel, said framework including a lower frame for holding a second sign panel, said upper frame being pivotally secured to the framework along a central longitudinal axis including means for disposing the framework in a triangular shaped supporting position and pivotally folding said framework upwards on either side of the upper frame to assume a folded position, wherein said means comprises spaced pairs of hinges fixedly secured to said upper frame and pivotally secured to pairs of legs disposed below said upper frame, wherein said pairs of legs from a triangular base in said supporting position and can be pivoted upward to a folded position with the upper frame adjacent to said legs wherein one pair of legs include the

second said frame mounted thereon, wherein the frames include rear pockets with inflatable means for retaining signs therein.

4,005,538

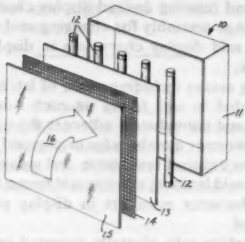
INTERNALLY ILLUMINATED RETROREFLECTIVE SIGNS

Chi Fang Tung, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 418,419, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 220,152, Jan. 24, 1972, Pat. No. 3,790,431, and Ser. No. 244,837, April 17, 1972, Pat. No. 3,802,944. This application Aug. 29, 1975, Ser. No. 608,915

Int. Cl.² G09F *7/08*

U.S. Cl. 40—132 R **2 Claims**



1. An illuminated sign comprising a box-like enclosure closed over its whole periphery except for an opening at the front of the sign, a light source within the enclosure, a transparent plate supported in front of the light source and carrying a printed image that is readable at the front of the sign by light from the light source, and light-diffusing means and a retroreflective light-transmissive sheeting between the transparent plate and the light source, and extending uniformly over the whole area defined by said opening, said sheeting comprising an open-mesh fabric of filaments that are encased around their whole circumference over at least those parts of their length that define open spaces of the web by a monolayer of minute transparent microspheres, the microspheres being partially embedded in a layer of binder material coated on the filaments and partially exposed above the layer of binder material whereby at least at the front of the sign the microspheres are uncovered over the whole area of said opening and open to the air, and said microspheres being covered over their partially embedded surface with specular reflective material, said sheeting permitting the light source to illuminate the sign image through the open spaces of the fabric while also retroreflecting light incident on the sign so as to further illuminate the sign image.

4,005,539

PEG BOARDS

George H. N. Chamberlain, Great Yeldham, England, assignor to Signco Limited, Bury, England

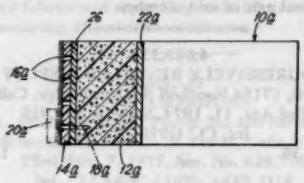
Filed Mar. 27, 1975, Ser. No. 562,634

Claims priority, application United Kingdom, Apr. 4, 1974, 15021

Int. Cl.² G09F *7/06*; B32B *3/26*

U.S. Cl. 40—143 **9 Claims**

1. A peg-board having a plurality of removable alphanumeric characters securely mounted thereto in selected positions for display purposes, the peg-board comprising; a sheet of a resiliently deformable plastics material having two faces, one face being exposed and consisting of a mass of short spikes matted together to give a flock-like finish, and the other face being secured to a body of a cellular polymeric material, a plurality of similar apertures extending through the sheet and being arranged as a regular lattice of intersecting rows and columns with the flock-like finish of the exposed face of the sheet acting to obscure the location of the apertures but not to hide their location completely, each of the removable characters being formed with at least one elongate pin which has a lateral dimension greater than the largest lateral dimension of



any of the apertures, and all of the pins extending through respective selected apertures and into the body, the cellular polymeric material of which is thereby deformed to define continuations of said selected apertures, whereby all of said pins are firmly gripped by a resilient deformation of at least the sheet.

4,005,540

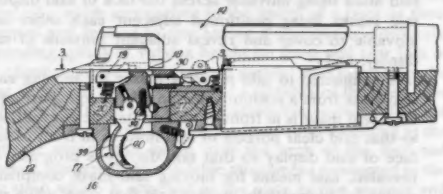
GUN TRIGGER MECHANISM

Marion M. Robinson, Schaumburg, Ill., assignor to Kanematsu-Gosho (U.S.A.), Inc., Arlington Heights, Ill.

Filed Aug. 27, 1975, Ser. No. 608,213

Int. Cl.² F41C *19/02*

U.S. Cl. 42—69 R **18 Claims**



1. A firearm trigger mechanism comprising: a trigger piece; means for movably mounting said trigger piece for releasably holding a sear against firing movement; first spring means for urging said trigger piece to a sear holding position; a finger loop blade having a pivot portion pivotally mounting said trigger piece; pivot means for pivotally mounting said blade adjacent said trigger piece for selectively effecting a sear releasing movement of said trigger piece as a result of a finger pull on said blade rearwardly from a first pull position against the biasing action of said first spring means; relatively lightly biased detent means for holding the finger loop blade in a second, light pull position forwardly of said first pull position; and second, relatively strong spring means for moving said finger loop blade rearwardly from said light pull position upon release of said detent means to cause sufficient force to be developed in said finger loop blade to effect said sear releasing movement of said trigger piece, said pivot portion being coaxial of said pivot means whereby said trigger piece and said finger loop blade are coaxially pivotable.

4,005,541

FISHING LEADER TENDER

Robert Brent Henrichsen, 1883 Zenda Way, Salt Lake City, Utah 84121

Filed Aug. 22, 1975, Ser. No. 606,875

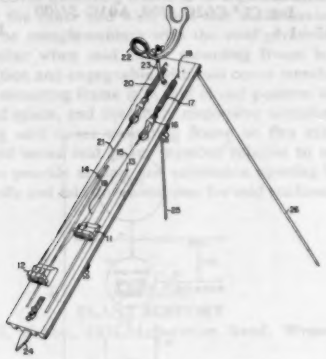
Int. Cl.² A01K *97/06*

U.S. Cl. 43—57.5 A **10 Claims**

1. A ganged fishing hook-leader tender comprising:

a. an elongated rigid base having a length substantially greater than its width,

b. a pair of hook engaging blocks on said base, said blocks positioned near one end of said base and spaced longitudinally and laterally from one another, said blocks having



soft hook engaging means facing the nearer end of said base,

c. tension spring means attached near an end of said base opposite said blocks,

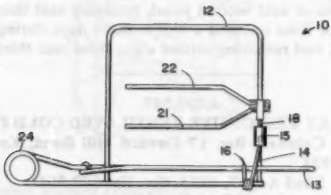
d. clip means attached to said tension spring means for holding the loop of a leader.

4,005,542

HUMANE ANIMAL TRAP

Guy C. Anderson, 2048 E. County Road F, White Bear Lake, Minn. 55110

Filed Sept. 26, 1975, Ser. No. 616,925
Int. Cl.² A01M *23/34*
U.S. Cl. 43—85 **4 Claims**



1. A lightweight animal trap for swiftly and humanely killing an animal, said trap being sufficiently compact for ease in carrying by a trapper while making the rounds of his trap line, said lightweight animal trap comprising:

a base member;

a first jaw connected to said base member so as to coact with said base member and outline an opening which an animal can enter;

a second movable jaw;

a spring connected to said movable jaw and said base member for powering said movable jaw toward said first jaw when said second movable jaw is in a set position;

said spring, said base member and said second movable jaw comprised of a continuous member with said spring located intermediate said base member and said movable jaw, said spring being spaced from the opening in said trap so that said movable jaw transverses the opening in said trap;

means for holding said movable jaw in a set position, said means including a latch member having one end for engaging said movable jaw and a second end for engaging said first jaw, further means on said latch member for releasably engaging a trigger mechanism;

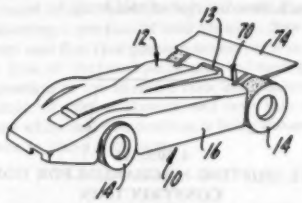
a triggering mechanism, said triggering mechanism comprising a trigger finger for projecting into the opening in the trap where an animal can enter; said triggering mechanism including a rotatable cam member slidably mounted on said first jaw, said trigger finger connected to said rotatable member, said rotatable member operable to hold said latch member in a stable position when said trigger finger is in a set position so that when an animal enters the opening in the trap, the animal rotates said triggering mechanism thereby releasing said latch member so that said movable jaw is freed to swiftly swing toward said first jaw in a scissoring action capable of instantly killing an animal located in the opening of the trap.

4,005,543

TOY VEHICLE-AIRCRAFT COMBINATION

Robert S. McKay, 7420 Beckwith Road, Morton Grove, Ill. 60053

Filed Sept. 11, 1975, Ser. No. 612,490
Int. Cl.² A63H *27/14*
U.S. Cl. 46—81 **12 Claims**



1. A toy vehicle - airplane combination comprising:

a. miniature wheeled vehicle having a threaded shaft constrained for rotation with one of the wheels of said vehicle;

b. means on said vehicle for carrying a miniature airplane;

c. spring biased propulsion means on said vehicle for ejecting said airplane from said vehicle;

d. detent means for maintaining the bias of said propulsion means until released;

e. release means threadedly mounted on said shaft for releasing said detent means, said release means reciprocating along said shaft in direct proportion to the linear travel of said vehicle;

f. indicator means on said vehicle for preselecting and indicating the distance to be traveled prior to release of said release means; and

g. stationary spring launch for receiving said vehicle and for propelling said vehicle along a surface.

4,005,544

PARACHUTE TOY

Donald L. Donner, P.O. Box 97, Rte. 2, Durham, Calif. 95938

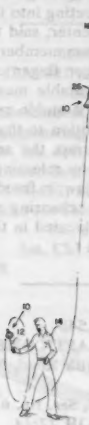
Filed July 28, 1975, Ser. No. 599,633
Int. Cl.² A63H *33/20*
U.S. Cl. 46—86 R **11 Claims**

9. In a parachute toy having a hollow body with an open back, a parachute stored in said body when said parachute is undeployed and means for placing said parachute in its undeployed position, said means comprising:

a line extending from the forward end of said body rearwardly through a central aperture in said parachute; and

a restraining button secured to said line rearwardly of said aperture, said button being larger than said aperture

whereby said parachute may be placed in its undeployed position by pulling the forward end of said line forwardly



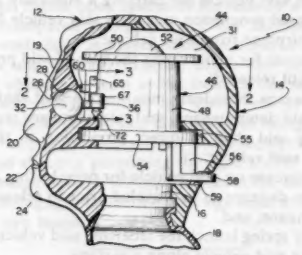
so that said button contacts said parachute and carries it into the hollow interior of said body.

4,005,545

EYE SHIFTING MECHANISM FOR DOLL CONSTRUCTION

George W. Ptaszek, Pascoag, and James A. King, Providence, both of R.I., assignors to Hasbro Development Corporation, Pawtucket, R.I.

Filed Jan. 12, 1976, Ser. No. 648,951
Int. Cl.² A63H 3/40
U.S. Cl. 46—167 **10 Claims**



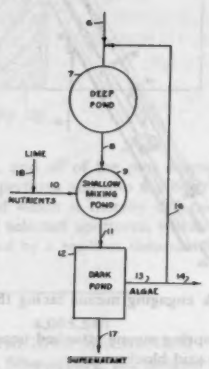
1. A mechanism for effecting movement of simulated eyes as mounted in the head of a doll construction, said head being formed with an interior chamber in which sockets are located for receiving the eyes therein, openings formed in said head and communicating with said sockets to provide visual access to said eyes exteriorly of said head, an actuator mounted for rotating movement in said head, a connector member operatively connected to said actuator and being responsive to rotating movement thereof for movement in a linear direction, said eyes being interconnected to said connector member and being movable in said sockets in response to linear movement of said connector member, and an operator joined to said actuator and being movable to produce the rotating movement of said actuator and the corresponding linear movement of said connector member, wherein a variety of positions of said eyes as moved in said sockets are selectively obtained.

4,005,546

METHOD OF WASTE TREATMENT AND ALGAE RECOVERY

William J. Oswald, Concord, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed July 21, 1975, Ser. No. 597,437
Int. Cl.² C02C 1/00; A01G 31/00
U.S. Cl. 47—1.4 **11 Claims**



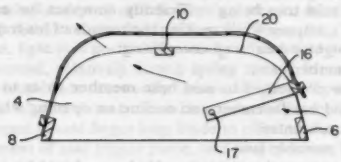
1. A method of waste treatment and algae recovery comprising making available in a first pond open to light and air a first body of sewage containing algae, retaining said first body under natural culture conditions for from ten to twenty days, then transferring to a second pond as a second body open to light and air at least a portion of said first body, substantially continuously agitating said second body in said second pond for from three to six days, then transferring to a third pond as a third body substantially closed to light at least a portion of said contents of said second pond, retaining said third body quiescent for from one and a half to three days during which algae settle, and removing settled algae from said third pond.

4,005,547

THERMALLY RESPONSIVE VENTILATED COLD FRAME

Edward N. Caldwell, Rte. 17 Coward Mill Road, Knoxville, Tenn. 37921

Filed Aug. 7, 1975, Ser. No. 602,551
Int. Cl.² A01G 13/04, 9/24
U.S. Cl. 47—28 R **5 Claims**



1. A cold frame comprising frame means including end walls and side walls, a cover mounting frame pivotally mounted on said frame means and movable through a plurality of positions opening and closing said cold frame, a cover member of light-transmitting, flexible sheet material of sufficient thickness and stiffness to cause the cover to assume a generally arcuate configuration when the ends thereof are constrained at a distance less than the length of said cover member, said cover member being connected at one end to

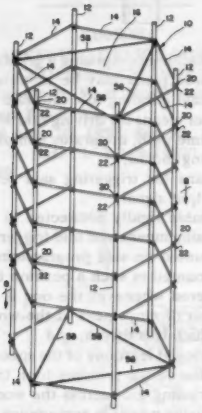
one of said end walls and at the other end to said cover mounting frame at a distance less than the length of said cover member whereby said cover member will assume a generally arcuate unsupported configuration in a closed position of said cover mounting frame, said closed position being defined when said cover mounting frame is in adjacent mating relationship to the other end wall, said side walls having edges formed to be complementary with the configuration of said cover member when said cover mounting frame is in said closed position and engageable with said cover member when said cover mounting frame is in said closed position to define an enclosed space, and thermally responsive actuator means for rotating said cover mounting frame to flex said cover member and move said cover member relative to said side walls and to provide at least one ventilation opening between said side walls and said cover member for said enclosed space.

4,005,548

PLANT SUPPORT

Abraham S. Nahon, 1026 Arboretum Road, Wyncote, Pa. 19095

Filed July 2, 1975, Ser. No. 592,395
Int. Cl.² A01G *17/06*
U.S. Cl. 47—45 **22 Claims**



1. A plant support comprising

A. at least three cylindrical support rods each having a longitudinal axes and a peripheral surface,

B. a plurality of cross wire holding means extending from the support rods,

1. said holding means being longitudinally spaced along the support rods,

2. some of said holding means defining a cross wire receiving opening therebetween,

3. said cross wire receiving opening extending outwardly from the support rod,

4. said cross wire receiving opening being open outwardly from the support rod and being closed at the support rod;

C. a plurality of cross wires interconnecting adjacent support rods at the holding means,

1. said cross wires comprising a medial portion and bent ends the bent ends being slidable upon said support rods, said support rods being rotatable in said bent ends,

2. the bent ends defining openings between the ends and the medial portion,

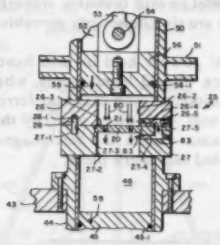
3. the openings being of a size to receive therein the holding means.

4,005,549

ABRASIVE FLOW MACHINING METHOD AND TOOLING

Kenneth E. Perry, Wellesley, Mass., assignor to Dynetics Corporation, Woburn, Mass.

Filed July 28, 1975, Ser. No. 599,472
Int. Cl.² B24C *3/32, 1/00*
U.S. Cl. 51—8 H **17 Claims**



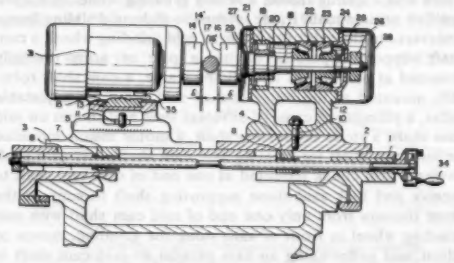
1. In an abrasive flow machine having means for passing an abrasive flow composition in two directions through a hole of a workpiece held by a tool having a first flow passage means in flow alignment with both ends of the hole of said workpiece, the improvement of said tool having a second flow passage means for diverting a portion of said abrasive flow composition away from said first flow passage means prior to it flowing through the hole of the workpiece and redirecting said diverted composition at the abrasive flow composition passing out of the hole of said workpiece and into said first fluid passage means when said composition is being passed through said workpiece in either direction.

4,005,550

MACHINE FOR MAGNETICALLY POLISH-GRINDING WORK PIECES HAVING LARGE DIMENSIONS

Atanas Dimitrov Kochemidov; Boris Georgiev Makedonski; Ivan Minkov Dumanov, and Stefan Georgiev Payakov, all of Sofia, Bulgaria, assignors to Znitmash of Chaussee za Gara Izkar, Sofia, Bulgaria

Continuation-in-part of Ser. No. 336,896, Feb. 28, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,781
Claims priority, application Bulgaria, Feb. 28, 1972, 19845
Int. Cl.² B24B *5/02*
U.S. Cl. 51—56 R **3 Claims**



1. A machine for magnetically polish-grinding work pieces having large dimensions, said machine comprising:

a. workpiece holding means for holding said work piece;

b. work piece rotating means for rotating said work piece holding means about a first axis and thereby rotating said work piece about said first axis;

c. rotating electromagnetic head means, said head means rotating about a second axis perpendicular to said first axis, said head means comprising first and second magnetic heads positioned on opposite sides of said work

piece such that the faces of said heads face said work piece and first and second drive means for independently rotating said first and second heads respectively, wherein said first and second drive means are independent of said work piece rotating means;

d. support means for holding said first and second heads and simultaneously moving said first and second heads in a direction along said second axis, said support means movable parallel to said first axis, whereby said first and second heads are simultaneously movable along said first axis; and

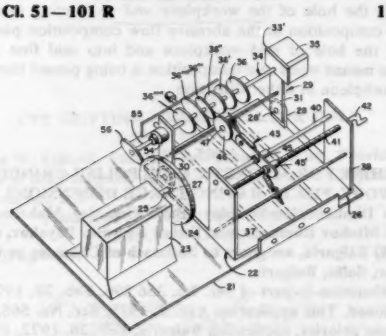
e. ferromagnetic powder held on said head means by the magnetic force of said head means, wherein said head means are positioned such that said ferromagnetic powder contacts said work piece whereby the movement of said head means causes the ferromagnetic powder to polish and grind said work piece.

4,005,551

CAM OPERATED STONE GRINDING DEVICE

Roy C. Lines, Box 383, Oriska, N. Dak. 58063

Filed Apr. 7, 1975, Ser. No. 565,418
Int. Cl.² B24B *17/02*
U.S. Cl. 51—101 R 1 Claim



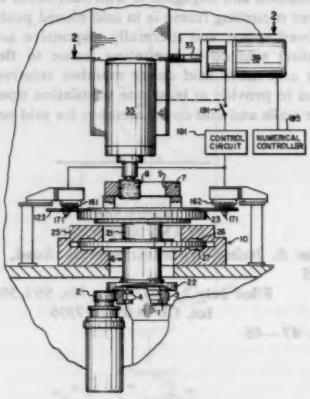
1. A stone grinding device for grinding stones for neck pendants into desired shapes and sizes, comprising a main frame and a sliding frame, a rotary grinding wheel in a fixed position on said main frame, means to slide said sliding frame transverse to the axis of rotation of said grinding wheel, a cam shaft support apparatus having a pair of arms pivotally mounted at one end to said sliding frame, a cam shaft rotatably mounted at the other end of said arms, an adjustable roller, a plurality of cams of different sizes and shapes on said cam shaft, a stone supporting shaft, a motor means mounted on said cam shaft for rotating said cam shaft, said cam shaft having a drill chuck mounted at one end of said cam shaft to receive and lock said stone supporting shaft to support the stone thereon from only one end of said cam shaft with said grinding wheel in front of said stone for grinding, means to adjust said roller along an axis parallel to said cam shaft in front of a selected one of said cams, spring means urging said cam shaft toward said roller, so that said stone to be ground will engage said grinding wheel, said selected cam having variations in its outer surface so that said selected cam is rotated by said cam shaft, said selected cam will push said cam shaft away and allow it to move toward said roller depending upon the variations, so that the grinding wheel will push said cam shaft away or allow it to move toward the roller depending upon the variations, so that the grinding wheel will grind the stone at the end of the cam shaft into shape variations of the selected cam.

4,005,552

APPARATUS FOR IMPROVED CONTROL OF A GRINDING MACHINE

Nils O. Hoglund, Short Hills, and Carl Hoglund, Murray Hill, both of N.J., assignors to Tri-Ordinate Corporation, Berkeley Heights, N.J.

Filed Oct. 21, 1974, Ser. No. 516,396
Int. Cl.² B24B *17/06, 19/00*
U.S. Cl. 51—101 R 31 Claims



1. In a grinding machine comprising a grinding tool, a worktable on which a workpiece may be mounted for grinding, means for feeding said grinding tool into said workpiece, and a cam and cam driver means for driving said worktable repeatedly through the same path, apparatus comprising:

at least one sensing means,

at least one means for triggering said sensing means to produce an output signal,

a programming table rigidly connected to said worktable, one of said sensing means and said triggering means being selectively mounted on said programming table and the other being mounted in such a position that said sensing means is triggered whenever the one is moved past the other as a result of movement of the worktable through the path on which it is driven, and

means for modifying at least one of the speed of the grinding tool, the position of the grinding tool, the lateral movement of the grinding tool across the workpiece, and the speed of the driving means in accordance with said output signal as the grinding tool is being fed into said workpiece.

4,005,553

CLAMPING DEVICE FOR USE IN SHARPENING SHEARS AND THE LIKE

Millard H. Eller, P.O. Box 111, Granville, Mass. 01034

Filed July 11, 1975, Ser. No. 594,958
Int. Cl.² B24B *3/52*
U.S. Cl. 51—218 R 6 Claims

1. A freely movable and manipulable clamping device for use in sharpening shear blades and the like with a grinding wheel, which device comprises:

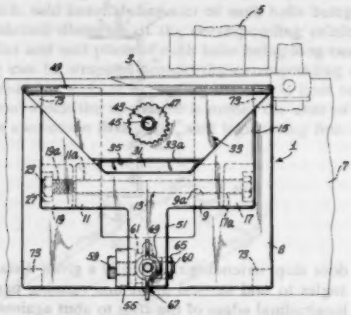
a. a base member;

b. a support member pivotally carried by the base member for free and unbiased pivotal movement with respect thereto, wherein the pivot point of the support member is disposed rearwardly of the center of gravity thereof to thereby provide a forward portion that is counterbalanced in a downward direction;

c. a clamping means carried by the forward portion of the support member, which clamping means includes:

i. a flange having a longitudinal wall section, and

ii. a detachable plate having a substantially isoceles trapezoidal configuration, wherein the shorter parallel side of the plate is disposed adjacent and parallel to the longitudinal wall of the flange and the longer parallel side overlaps the blade when the latter is in a clamped position; and



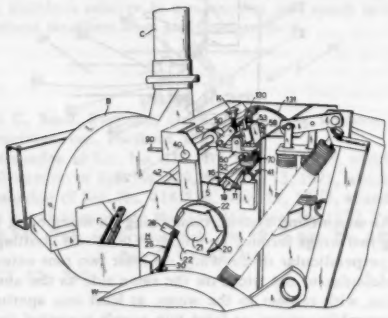
d. adjustable means for limiting the degree of free and unbiased pivotal movement of the support member with respect to the base member to thereby control the desired grinding angle between the blade edge and the grinding wheel.

4,005,554

BLADE SHARPENING DEVICE FOR ROTATABLE CHOPPING CYLINDERS

Steven James Campbell, West Bend, Wis., assignor to Gehl Company, West Bend, Wis.

Filed Aug. 20, 1975, Ser. No. 606,057
Int. Cl.² B24B *19/00*
U.S. Cl. 51—249 **4 Claims**



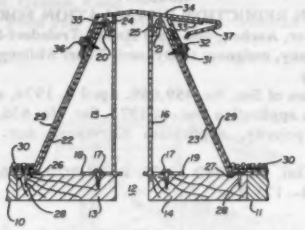
1. A blade sharpening device for use with a forage harvester having a housing and a cutting cylinder rotatable about an axis and retained within the housing and having a plurality of circumferentially spaced spiral shaped cutting blades to be sharpened, said blades each having a radially inner surface, a radially outer surface, and a bevelled cutting surface, said sharpening device comprising guide track means supported on said housing, a carriage movably supported on said guide track means for movement generally parallel to said cylinder axis, a grinding wheel supported on the carriage and including a flat side selectively engageable with the bevelled cutting surface of one of said cutting blades to be sharpened, and guide means including an arm secured to said carriage and extending therefrom, said guide means also including guide rollers supported on said arm and engageable with the inwardly facing surface of said one cutting blade adjacent and opposite said bevelled cutting surface for guiding said grinding wheel along said bevelled cutting surface, and means biasing said cutting blade into said guide rollers to position said knives for grinding engagement with said wheel.

4,005,555

ROOF EXPANSION JOINT

Abraham H. Roth, and Dave Roth, both of Youngstown, Ohio, assignors to Roth Bros. Inc., Youngstown, Ohio

Filed July 3, 1975, Ser. No. 593,013
Int. Cl.² E04D *1/36*
U.S. Cl. 52—60 **6 Claims**



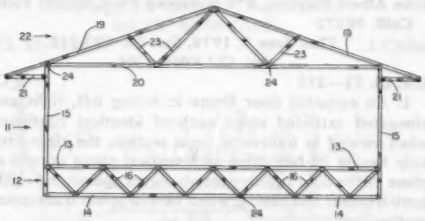
1. A roof expansion joint structure for bridging and closing an elongated opening in a roof and comprising spaced upright longitudinally extending members defining said opening, longitudinally extending cants attached to said upright members adjacent their upper ends and extending downwardly and outwardly therefrom so as to engage said roof, a longitudinally extending outturned angular flange on the upper end of one of said cants extending opposite said opening, and a longitudinally extending cover strip having a downturned angular flange on one edge and an inturned angularly disposed flange on its other edge extending toward said opening and positioned on and attached to the other one of said cants and slidably engaged on said outturned angular flange, said inturned angularly disposed flange on the cover strip extending inunder said outturned angular flange on the other cant so as to form a movable weather tight seal across said elongated opening in said roof.

4,005,556

LIGHTWEIGHT TRUSS-FRAMED HOUSE

Roger L. Tuomi, Madison, Wis., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 509,610, Sept. 26, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 615,016
Int. Cl.² E04B *7/02, 7/12*
U.S. Cl. 52—93 **7 Claims**



1. A building, comprising a plurality of sill plates installed on a foundation,

a plurality of frames disposed in parallel vertical planes normal to the plane of said sill plates,

each frame comprising a floor truss system, wall studs connected to the ends of said system and extending upward therefrom, and a roof truss extending between and connected to the upper ends of said studs,

said floor truss system, comprising a top floor chord and

bottom floor chord, parallel with one another, which extend between and connect at their ends to said studs, with said bottom floor chord being adjacent to said studs' lower ends, with web members extending between and connected to said chords,

means connecting said frames to said sill plates,

means securely anchoring said frames in proper vertical orientation, said last-mentioned means running perpendicular to said frames.

4,005,557

SUCTION REDUCTION INSTALLATION FOR ROOFS

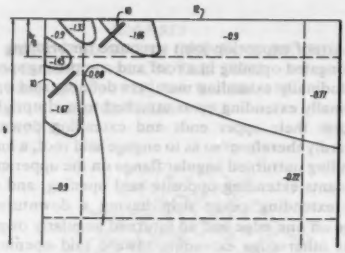
Carl Kramer, Aachen, and Karl Haage, Troisdorf-Spich, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Continuation of Ser. No. 459,069, April 8, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,451

Claims priority, application Germany, Apr. 7, 1973, 2317545

Int. Cl.² E04D *13/00*; E04H *9/14*, *9/16*

U.S. Cl. 52—173 R **30 Claims**



1. An arrangement for reducing wind suction forces on a roof the surface of which has no gradient, the roof surface in a horizontal projection being polygonal in shape with sides thereof intersecting and forming roof corners, the arrangement comprising: at least two wind disturbing means for disturbing the flow condition of the wind along the surface of the roof and for reducing eddy formations thereon, said at least two wind disturbing means being provided only in the zone of at least one of the roof corners at a right angle to a bisector of the angle of the at least one roof corner, and means for mounting said wind disturbing means to project beyond the normal limitation of the roof.

4,005,558

EXTRUDED DOOR FRAME

John Albert Barrison, 670 Hampden Place, Pacific Palisades, Calif. 90272

Filed June 7, 1976, Ser. No. 693,310

Int. Cl.² E06B *1/04*

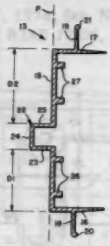
U.S. Cl. 52—213 **5 Claims**

1. An extruded door frame including left, right and top elongated extruded strips each of identical configurations when viewed in transverse cross section, the right extruded strip having its face lying in a vertical plane normal to the plane of the door opening for abutment against the right door jamb trimmer and having, when viewed in top transverse cross section:

a. opposite longitudinal edges rearwardly extending from said face at right angles to said vertical plane to straddle said trimmer, said edges including integrally formed finishing flanges extending laterally outwardly from intermediate points on the rearwardly extending portions of said edges,

b. a door stop portion formed in the front face of the strip by a portion extending forwardly at right angles from the vertical plane, thence parallel to said plane and thence rearwardly at right angles to said plane, said door stop portion lying parallel to and intermediate said opposite longitudinal edges, and

c. two pairs of parallel ribs, one pair on each side of said



door stop, extending rearwardly a given distance at right angles to said vertical plane and running parallel to the longitudinal edges of the strip to abut against the face of said trimmer and stabilize said strip in its secured position.

4,005,559

ASSEMBLING PIECE AND APPLICATION TO A PANEL ASSEMBLY

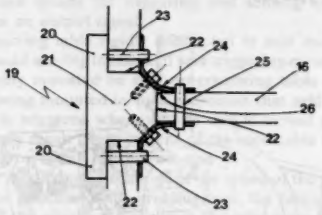
Marcel Edouard Mathou, Rte. de Cantaranne Zone Industrielle, 12000 Rodez, France

Filed June 9, 1975, Ser. No. 584,876

Claims priority, application France, June 13, 1974, 74.20567

Int. Cl.² E04F *19/06*

U.S. Cl. 52—282 **8 Claims**



4. An assembling system, comprising an assembling piece having two wings forming an angle, at least two abutting surfaces perpendicular to the wings, at least two pins extending perpendicular to the wings on the same side as the abutting surfaces, with respect to the wings, at least one aperture in said assembling piece, at least two panels mounted on said pins, at least one clamp mounted on the free end of said pins and maintained by securing means associated to said apertures in said assembling piece.

4,005,560

REINFORCED CONCRETE APPLIANCE

Herbert John Simpson, Andover, England, and Walter Heller, Horgen, Switzerland, assignors to Preformed Line Products Company, Cleveland, Ohio

Continuation of Ser. No. 506,263, Sept. 16, 1974, abandoned, which is a continuation of Ser. No. 329,580, Feb. 5, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,614

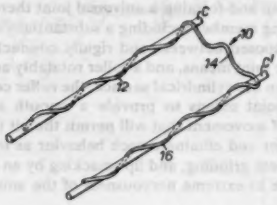
Claims priority, application United Kingdom, Feb. 11, 1972, 6437/72

Int. Cl.² E04C *5/18*

U.S. Cl. 52—677 **4 Claims**

1. An appliance for holding a pair of elongated non-coaxial reinforcement members for a cast material relative to one

another and spaced from the surface of a form while said material is being cast and is hardening, said appliance comprising: a pair of resilient non-coaxial legs each adapted to encircle and grip a corresponding one of said reinforcement members, each of said legs being helically preformed to a multi-turn helix having a predetermined internal diameter and an open pitch, said internal diameter of each helix being less than the external diameter of the corresponding reinforcement member and said pitch of each helix being long enough that the leg can be wrapped around the corresponding reinforcement member without exceeding the elastic limit of the material from which the appliance is made, the axes of said legs lying in a common first plane, said legs having first ends

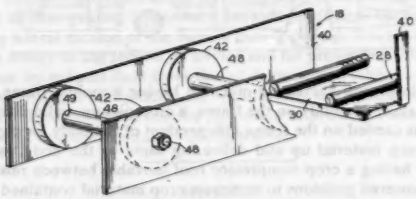


spaced apart and interconnected by a bridging portion lying in a second plane extending through said first ends perpendicular to said first plane, said bridging portion including opposite ends each integral with one of said first ends of said legs and a form surface engaging portion extending between said opposite ends and spaced from said legs to engage said form surface and space said legs therefrom, each said leg gripping the corresponding reinforcement member against displacement relative thereto and said bridging portion being entirely spaced from said reinforcement members and maintaining said legs in said non-coaxial relationship, whereby said legs and bridging portion cooperatively position said reinforcement members relative to one another and space said reinforcement members from said form surface.

4,005,561
DOME JOINT

Hollis C. Scott, Portland, Oreg., assignor to Western Wood Structures, Inc., Portland, Oreg.

Continuation of Ser. No. 610,307, Sept. 4, 1975, which is a continuation of Ser. No. 540,399, Jan. 13, 1975, which is a continuation of Ser. No. 416,736, Nov. 19, 1973, abandoned, which is a division of Ser. No. 318,466, Dec. 26, 1972, Pat. No. 3,810,342. This application Feb. 19, 1976, Ser. No. 659,348
Int. Cl.² F16B *7/18*
U.S. Cl. 52—260 **5 Claims**

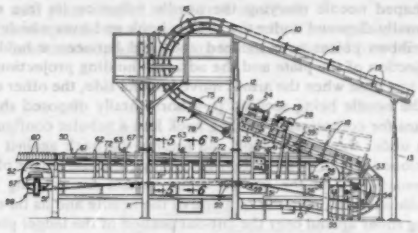


1. In a beam connector assembly,
a plurality of elongated straps lying in parallel planes and adapted to be secured to a beam,
bridge means comprising a plate secured to end portions of the straps and extending across the beam,
the plate lying in a plane transverse to said parallel planes and parallel to the longitudinal axis of the beam,
fastener means comprising at least one stud fixed to the plate in a position lying on the plate and parallel to and extending longitudinally of and beyond the straps,
the space between the straps being entirely unobstructed except for the plate and the stud,
the portion of the stud secured to the plate lying entirely between the plates.

4,005,562
CONTAINER PACKER

Peter Vischer, Golden, Colo., assignor to Coors Container Company, Golden, Colo.

Filed July 24, 1975, Ser. No. 598,825
Int. Cl.² B65B *5/06*
U.S. Cl. 53—57 **10 Claims**

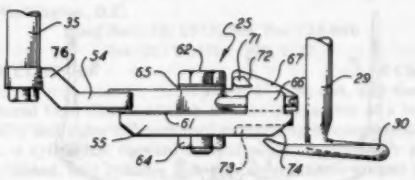


1. Bottle packer apparatus, in combination with cases provided with divider means which divide the cases into separate single bottle spaces, for encasing bottles in said cases in a continuous operation comprising
a. a case conveyor on which inverted cases are moved in a downwardly inclined plane, said conveyor comprising a stationary section and a pivotally mounted section extending in continuation of the stationary section,
b. means on the case conveyor contacting the side walls of the inverted cases and moving said cases to a position where the cases drop downwardly, and
c. a bottle conveyor having a moving belt on which bottles are carried neck up in a plurality of lanes parallel to the direction of travel of the belt to an area beneath an inverted case which is dropped from the case conveyor, the bottle conveyor speed exceeding the speed of the case conveyor and causing accumulation of bottles adjacent one end of a loaded case.

4,005,563
HOLDER AND SHEAR LEDGER PLATE FOR PACKAGE TYING MACHINES

J. Leonard Nitsch, 101 Park St., Syracuse, N.Y. 13203

Filed Sept. 24, 1975, Ser. No. 616,433
Int. Cl.² B65B *51/08*
U.S. Cl. 53—138 A **1 Claim**



1. In a bag tying machine in which an endless conveyer belt carries bagged loaves of bread past a tying station with means for guiding the open end of each bag toward the tying station and bunching it into a neck, a reel carrying a supply of wire-reinforced tie ribbon adjacent the tying station, the ribbon being led over a series of rollers to a needle carried roller, tie tensioning means connected to the supply reel, a tie holder

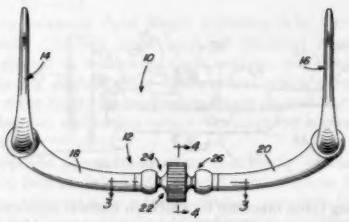
and shear ledger plate assembly at the tying station, the assembly having a holder and shear arm pivotally secured to the stationary plate, the plate having a cut-out portion at its approach end for access therethrough for the tie ribbon and having shear edges and holding projections at either side, the arm having at its approach end an angularly tapered nose having on either side a shear edge and a holding projection adapted to cooperatively engage the shear edge and holding projection of the plate on either side, machine means for moving the arm from side to side, support means at the tying station including a horizontally projecting support flange, a twister rotatably supported from above at the tying station, the twister having a horizontally disposed C-shaped hook adapted to underlie the plate and adapted to twist a loop of tie passing through the cut-out portion of the plate when the hook is rotated, means for rotating the hook, a vertically disposed C-shaped needle carrying the needle roller on its free end normally disposed under the twister hook and over which the tie ribbon passes to a sheared end held between a holding projection of the plate and the adjacent holding projection of the arm nose when the arm is moved to one side, the other end of the needle being secured to a horizontally disposed shaft, means for compressing the bag neck into a tubular configuration under the twister hook and forcing the neck against the tensioned length of tie ribbon extending from the ledger plate approach end to the needle roller, means for rotating the needle shaft to move the free end of the needle and its tie-carrying roller up and over the cut-out portion of the ledger plate, the nose having tie-stop portions on either side to contact the tie adjacent its roller; timing means initiated by the passing of each bag open end for rotating the twister hook, rotating the needle shaft, operating the neck compressing means, and after a delay, moving the holder and shear arm from one side to the other for cutting the length of tie around the bag neck and holding the sheared end of the tie for the next cycle of the tying operation; the improvement comprising: the ledge plate having an integral upwardly projecting flange connected to said support flange and which offsets the ledger plate downward to distance for lowering the ledger plate to a level at which its bottom surface is substantially at the level of the upper surface of the twister hook, the holder and shear arm having a flange that offsets the trailing end of the holder and shear arm upward a like distance for connection with its moving means, the bottom surface of the ledger plate having an arcuate relieved portion for clearance above the twister hook, and the approach end of the ledger plate being beveled downward and toward its trailing end for deflection of an accidentally bent twister hook.

4,005,564

BRIDLE BIT

Donald L. Simington, P.O. Box 401, Calabasas, Calif. 91302

Filed May 27, 1975, Ser. No. 581,418
Int. Cl.² B68B *1/06*
U.S. Cl. 54—8 **4 Claims**



1. In a bit for horses which includes an elongated mouthpiece provided at opposite ends with respective attachment means for attaching a bridle to the bit, the improvement wherein the mouthpiece comprises, in combination:

a. a pair of longitudinally extending, substantially rigid arms, each of the arms being connected to a respective one of the attachment means;

b. a center coupling member disposed between and connected to the arms; and

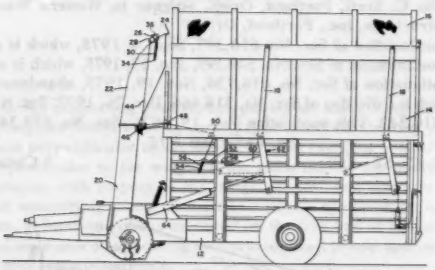
c. the mouthpiece further including separate, spaced joint means for connecting the center coupling member to each of the arms for universal movement between the coupling member and the respective arms, each of the joint means including a ball and socket joint means permanently attached integral with the coupling member and detachably connected to the associated one of the arms, each ball and socket means joint including a ball integral with the coupling member and a socket means mating with the ball and forming a universal joint therewith, and the coupling member including a substantially cylindrical surface disposed between, and rigidly connected to, the balls of the joint means, and a roller rotatably and slidably arranged on the cylindrical surface, the roller cooperating with the joint means to provide a smooth action and freedom of movement that will permit the bit to function as a pacifier and eliminate such behavior as tongue protruding, teeth grinding, and lip smacking by an associated animal due to extreme nervousness of the animal.

4,005,565

STACK WAGON

Terry Lee Lowe, Ankeny, and Glenn Dale Head, Des Moines, both of Iowa, assignors to Deere & Company, Moline, Ill.

Continuation of Ser. No. 473,746, May 28, 1974, abandoned.
This application Aug. 15, 1975, Ser. No. 605,142
Int. Cl.² A01D *87/00*
U.S. Cl. 56—344 **11 Claims**



1. In a crop harvesting machine having a mobile frame, a crop-receiving body on the frame, a crop pickup and delivery means carried on the frame independent of the body for picking crop material up and delivering same to the body, said body having a crop compressor roof movable between raised and lowered positions to compress crop material contained in the body, and lift means for effecting vertical movement of the compressor roof, the improvement comprising: a deflector movably carried by the crop delivery means; interconnecting means between the compressor roof lift means and deflector for causing the deflector to respond to the vertical movement of the compressor roof and control the inclination of the crop stream issuing from the delivery means; and biasing means acting with said interconnecting means to move the deflector towards the limits of its movement.

4,005,566

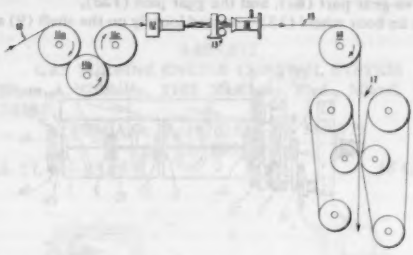
PROCESS AND APPARATUS FOR IMPORTING COHERENCE TO TOW

William Edward Hawkins, Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 749,245, July 16, 1968, abandoned, which is a continuation of Ser. No. 669,634, Aug. 9, 1967, abandoned, which is a continuation-in-part of Ser. No. 524,750, Feb. 3, 1966, abandoned. This application Mar. 3, 1969, Ser. No. 814,492

Int. Cl.[2] D02J *1/04, 1/08*

U.S. Cl. 57—34 B **16 Claims**



1. In the process of combining a large number of filaments into a tow for subsequent processing, the improvement for imparting coherence to the tow which comprises feeding the filaments as a bundle through a fluid zone, jetting into the fluid zone a plurality of high velocity fluid streams which include streams angled to exert a braking action on the forward travel of the bundle while maintaining the bundle open and streams directed tangentially against the traveling bundle for providing a torquing vortical whirling motion to the filaments to interentangle the filaments into a coherent tow, and withdrawing the tow from the fluid zone through a belt piddler to provide a tow having good interfilament cohesion.

14. Apparatus for treating a large bundle of filaments to form a coherent tow which comprises feed means for supplying a tow bundle of filaments at uniform speed, a first jet device for pulling the bundle from said feed means and for opening the bundle, an internal axial passage through said device for the bundle, a nozzle for jetting fluid into said passage in a spiralling path and directed to forward the bundle with a torquing action, a second jet device for maintaining the bundle open and interentangling the filaments to form a coherent tow, a treating chamber in said second device for the bundle, a fluid duct into said chamber for directing fluid against the direction of bundle movement to provide a turbulent braking action on the bundle, other fluid ducts into said chamber for directing fluid in a generally tangential direction to the path of the bundle to impart a vortical whirling motion in the same direction as the spiralling path of fluid in said first jet device, guiding means between said jet devices for confining lateral motion of the bundle during passage from the first jet device to the second jet device and for preventing interference by exhaust fluid from the jet devices, and takeup means comprising a belt piddler for withdrawing the bundle at uniform speed from the second jet device to provide a coherent tow of essentially straight configuration.

4,005,567

DEVICE FOR SECURING THE TAIL END OF YARN BOBBINS

Giuseppe Mariani, Milan, Italy, assignor to Snia Viscosa Societa Nazionale Applicazioni Viscosa S.p.A., Milan, Italy

Filed Oct. 16, 1975, Ser. No. 623,004

Claims priority, application Italy, Oct. 25, 1974, 28791/74

Int. Cl.[2] D01H *1/38*

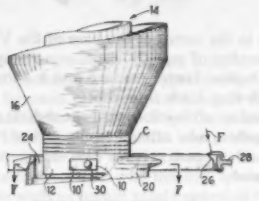
U.S. Cl. 57—34 TT **7 Claims**

1. In a thread or yarn winding system of the type including a rotating bobbin tube onto which thread or yarn is wound to form a thread or yarn cop, wherein after formation of the cop said tube and cop are withdrawn from a spindle to form a thread or yarn transfer tail, and means for grasping and retaining said transfer tail; the improvement wherein said grasping and retaining means comprises:

at least one flexible plate-shaped member attached to the outer surface of said tube adjacent one end thereof and extending substantially circumferentially thereof, said plate-shaped member having a first portion secured to said outer surface of said tube, said plate-shaped member having at least one circumferentially endwise second portion free of attachment to said outer surface of said tube;

a thermoplastic coating covering at least that portion of said outer surface of said tube to which said first portion of said plate-shaped member is attached;

thermoplastic attachment means melted into and secured to said thermoplastic coating for attaching said first portion



of said plate-shaped member to said outer surface of said tube;

said plate-shaped member having a flexibility such that upon rotation of said tube said second portion of said plate-shaped member bends and separates from said outer surface of said tube due to centrifugal force, whereby said transfer tail may be engaged between said second portion of said plate-shaped member and said outer surface of said tube; and

a cup-shaped element having a cavity into which said one end of said tube and said plate-shaped member extend during the formation of said cop, said cavity being defined by an inner surface spaced from said outer surface of said tube by a distance to form means for limiting the amount of separation of said second portion of said plate-shaped member from said outer surface of said tube and for preventing said second portion from bending circumferentially backwardly over said first portion of said plate-shaped member.

4,005,568

SELF-CLEANING OPEN-END YARN SPINNING APPARATUS

Craig L. Folk, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Nov. 18, 1975, Ser. No. 633,066

Int. Cl.[2] D01H *11/00, 1/12*

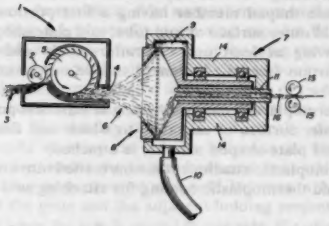
U.S. Cl. 57—56 **4 Claims**

1. An apparatus for the removal of dust, dirt, and foreign material from fiber feedstock and the production of a better quality and more efficient yarn comprising in combination:

a. a cylindrical forward or first section horizontally positioned, said cylinder diameter several times greater than its length, said first section also critically designed with a hollow V-groove center to receive, gather, and spin fiber feedstock into yarn, said critically designed hollow center described as follows:

1. a wide entrance opening to allow for efficient gathering of fiber feedstock said entrance opening hollowed back at an angle to the periphery of the outer cylinder wall leaving only a thin outer wall in the vertex of the V-

groove, said vertex of said V-groove defined by passing an imaginary vertical plane through the vertexes formed in the cross-sectional view of the said open end spinner thus forming complimentary angles with 37° on the entrance opening side of said vertical plane and 14° on the exit opening side, and said thin wall perpherated in equal spaces with holes around the entire circumfer-



ence in the vertex at the base of the V-groove forming a plurality of equally sized, equally spaced holes and said hollow center leading into a narrow exit opening which then leads into

b. a second or aft section, said second/aft section comprising a hollow tube affixed to the exit of the said first section, said second section also being positioned in the horizontal.

4,005,569

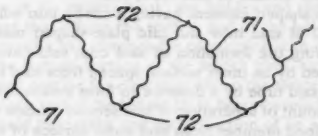
TEXTURED YARN

Claude Corbiere, Villa "Ce Regal," Route de Saint-Alban, Riorges, Loire (42), France

Division of Ser. No. 241,166, April 5, 1972, abandoned. This application Oct. 2, 1974, Ser. No. 511,373

Int. Cl.[2] D02G *3/24*, *1/00*

U.S. Cl. 57—140 J **16 Claims**



1. A textured yarn composed of continuous filaments and having a crimp with equally spaced marked cusps, the molecular structure of said continuous filaments in said cusps being different from the molecular structure of the portions of said continuous filaments between consecutive cusps, and additional deformations on said filaments, wherein said additional deformations occur between said cusps.

4,005,570

LEAF-TYPE DIGITAL CLOCK

Kazuo Miyamoto, Showa; Hideo Koide, Urawa, and Isao Suzuki, Noda, all of Japan, assignors to Rhythm Watch Company, Limited, Japan

Filed July 8, 1975, Ser. No. 593,971

Claims priority, application Japan, July 9, 1974, 49-77827

Int. Cl.[2] G04C *21/16*; G04B *19/02*

U.S. Cl. 58—16 D **4 Claims**

1. In a leaf-type digital clock in which hour indicating, 10-minute indicating and 1-minute indicating leaves are hinged on the horizontally oriented frames and shown in the front windows of the clock, providing that m, n and p are all positive integers, a combination of the following A-14 J:

A. the 2nd wheel (time) (1) connected with a synchronous motor and having the Geneva-gear part (1*a*),

B. a 1-minute wheel (2) mounted loosely on the shaft (5) and having the Geneva-gear part 2*a* which engages intermittently with said Geneva-gear part (1*a*),

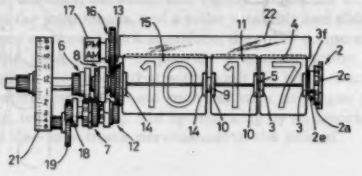
C. a 1-minute median wheel (6) secured to the shaft (5) and having the Geneva-gear part (6*a*),

D. a 10-minute median wheel (7) consisting of the Geneva-gear part (7*a*) which engages intermittently with said Geneva-gear part (6*a*) and the gear part (7*d*),

E. a 10-minute wheel (8) secured to the shaft (9) in which the shaft (5) is telescoped, and consisting of the Geneva-gear part (8*a*) and the gear part (8*d*) which meshes with said gear part (7*d*),

F. a hour median wheel (12) consisting of the Geneva-gear part (12*a*) which engages intermittently with said Geneva-gear part (8*a*), and the gear part (12*d*),

G. an hour wheel (13) mounted loosely on the shaft (9) and



having the gear part (13*d*) which meshes with said gear part (12*d*),

H. 1-minute unit frames (3, 3) of one body secured to said shaft (5) but connected with said one-minute wheel 2 through ratchet mechanism, and carrying (10*m*) sheets of one-minute indicating leaves (4, 4), . . . on their peripheries, said ratchet mechanism being so composed as the points of jumper springs (2*e*, 2*e*), . . . which are anchored on the wheel (2) are engaged with corresponding teeth of the ratchet gear (3*f*) which is anchored on the frame (3),

I. 10-minute unit frames (10, 10) of one body secured to said shaft (9) and carrying 6*n* sheets of 10-minute indicating leaves (11, 11), . . . on their peripheries,

J. hour unit frames (14, 14) of one body secured to said hour wheel (13) and carrying 12*p* sheets of hour indicating leaves (15, 15) . . . on their peripheries.

4,005,571

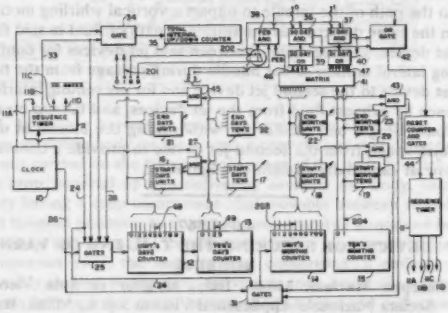
ELAPSED TIME REMINDER WITH CONVERSION OF CALENDAR DAYS INTO ELAPSED TIME

Emanuel Wolff, 1241 Welsh Road, Huntington Valley, Pa. 19006

Filed Nov. 6, 1975, Ser. No. 629,511

Int. Cl.[2] G04F *8/00*

U.S. Cl. 58—39.5 **11 Claims**



1. An electronic reminder comprising:

first means for manually entering the present time,

second means for manually entering a selected future time desired,

electronic means for obtaining the elapsed time interval between the present and selected future time,

an electronic timer associated with said electronic means for counting the elapsed time between the present and selected future times as it expires,

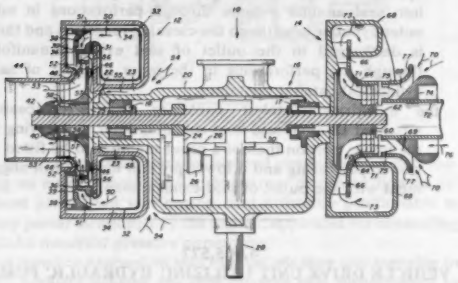
and indicator means responsive to said electronic means and timer means for signaling the completion of said elapsed time.

4,005,572

GAS TURBINE ENGINE CONTROL SYSTEM

William A. Giffhorn, 1101 McKinley Blvd., Miami, Okla. 74354

Filed Apr. 18, 1975, Ser. No. 569,579
Int. Cl. F02C 9/04
U.S. Cl. 60—39.28 R **15 Claims**



1. A gas turbine engine, comprising:

a. a rotary air compressor, having a stator with an air inlet, a substantially circular outlet air duct, and a compressor rotor said compressor including an axial air inlet for said compressor comprising the annular space between an inner cylinder, coaxial with said rotor shaft, and an outer flared coaxial cylindrical wall, and including means to adjustably partially close off said annular opening;

a variable angle pre-whirl vanes in the inlet of said compressor;

b. a gas turbine having a stator with a substantially circular hot gas inlet duct, a gas outlet and a turbine rotor and means to control the cross-section for flow of hot gases to said turbine rotor;

c. a housing having a rotor shaft journalled in said housing, said compressor rotor mounted on a first end of said rotor shaft, and said turbine rotor mounted on the second end of said rotor shaft;

d. substantially cylindrical combustion chamber means connecting the end of said compressor outlet air duct to the inlet end of said turbine hot gas inlet duct;

e. a tubular extension of said housing in which is positioned the support bearing for said second end of said rotor shaft on which said turbine rotor is mounted;

f. said circular hot gas inlet duct for supplying hot gas to the turbine inlet nozzles surrounding said tubular extension with an annular clearance therebetween; and

g. auxiliary blade means on the back surface of said turbine rotor to draw cool outside air axially through said annular clearance, and radially along the back surface of said turbine rotor, and into said turbine nozzle along with said hot gases from said hot gas inlet duct;

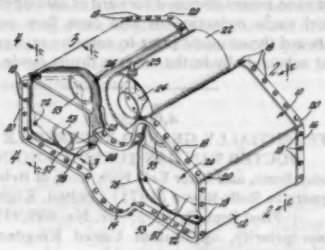
whereby said tubular extension, the turbine nozzle and said turbine rotor are cooled by said cool air flow.

4,005,573

RECUPERATIVE MOUNTING

Charles H. Smale, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 1, 1975, Ser. No. 618,450
Int. Cl. F02C 7/10
U.S. Cl. 60—39.32 **2 Claims**



1. In a recuperative turbine engine, a mounting arrangement for a heat exchanger of the type having an elongated core extending between relatively stationary walls of the turbine and with lateral flanges extending from either side of the core to engage mounting components comprising:

rod supports on either side of said core extending normal to the opposite turbine walls with the ends spaced relative to the adjacent walls to permit axial expansion thereof without engagement with the walls;

tubular rings loosely encircling the end portions of one of said rod supports being fastened at one end to the turbine walls for supporting the rod and core and to permit rotation of the rod;

linking means with a bore in one end for loosely engaging the end portions of the second rod support and having an opening in the other end;

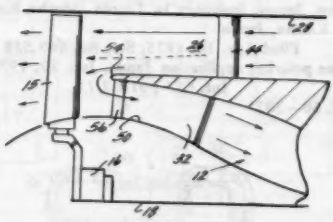
pin means fastened to the turbine walls and extending into loose engagement into the openings of the linking means to support said second rod support and the core and also to permit pivotal movement of the core about the axis of the first rod support.

4,005,574

REVERSE PITCH FAN WITH DIVIDED SPLITTER

Leroy H. Smith, Jr., Cincinnati, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 21, 1975, Ser. No. 569,925
Int. Cl. F02K 3/06
U.S. Cl. 60—226 A **7 Claims**



1. A gas turbofan engine including:

a core engine;

a substantially annular fan duct having an inner wall and an outer wall;

a variable pitch fan disposed in said fan duct and adapted to pressurize a motive fluid in a forward thrust mode and a reverse thrust mode;

flow splitter means disposed within said fan duct and adapted to partially define a core engine duct, for receiving a core flow portion of said motive fluid, and a surrounding bypass duct;

means disposed within said fan duct axially forward of said flow splitter means to define a circumferentially disposed opening therebetween;

outer vane means disposed within said bypass duct; and

inner vane means disposed forward of said opening to effect swirl angle reduction of said core flow portion in the forward thrust mode prior to entering said core duct, but not substantially in the reverse thrust mode.

4,005,575

DIFFERENTIALLY GEARED REVERSIBLE FAN FOR DUCTED FAN GAS TURBINE ENGINES

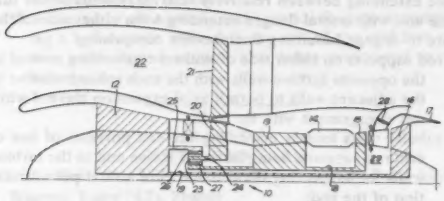
Alexander Scott, and Peter Eric Peck, both of Bristol, England, assignors to Rolls-Royce (1971) Limited, England

Filed Sept. 3, 1975, Ser. No. 609,931

Claims priority, application United Kingdom, Sept. 11, 1974, 39694/74

Int. Cl.² F02K *3/04*; F02C *3/06*

U.S. Cl. 60—226 R **8 Claims**



1. A ducted fan gas turbine engine comprising a fan, two shafts, a turbine drivingly connected to each shaft for driving the shafts in opposite rotational directions, and a gear mechanism, wherein the two shafts are connected with the gear mechanism, the output of the gear mechanism being connected to drive the fan, the gears of the gear mechanism being arranged so that a given change of the relative speeds of rotation of the two shafts causes a reversal of the direction of rotation of said output, and means for varying the relative speeds of rotation of the shafts for achieving said given change of relative speeds of rotation thereof.

4,005,576

INTERNAL COMBUSTION ENGINE EXHAUST MANIFOLD WITH CYLINDRICAL BUILT-IN CATALYST CONTAINER

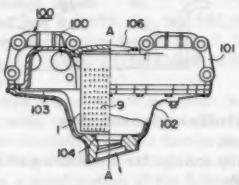
Hidetaka Nohira; Hironori Bessho, and Yasuyuki Sakai, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Apr. 18, 1975, Ser. No. 569,558

Claims priority, application Japan, Jan. 20, 1975, 50-8976

Int. Cl.² F01N *3/15*

U.S. Cl. 60—302 **1 Claim**



1. An internal combustion engine exhaust manifold having a built-in catalyst container of a cylindrical shape, wherein said exhaust manifold comprises:

upper and lower casings,

a heat shielding liner of heat resistant material provided inwardly of and spaced from said upper and lower casings, and

an air injection port provided within said exhaust manifold at a position adjacent a cylindrical catalyst container for injecting secondary air thereto during operation of an engine, said secondary air being fed from a secondary air pump which is separately mounted on said engine,

said cylindrical catalyst container being filled with a catalyst suitable for cleaning the engine exhaust, and comprising

concentric inner and outer cylinders having a radius differential of 20 to 30 mm., and

annular lids fitting at opposite ends of said inner and outer cylinders to define therebetween an annular volume filled with said catalyst,

said inner and outer cylinders having an upper wall portion with no perforations over a predetermined distance from the upper ends thereof and a lower wall portion containing multiple perforations which extend contiguously from said upper wall portion down to the lower ends of the cylinders such that the engine exhaust gas is introduced into said annular volume through perforations in said outer cylinder to undergo the cleaning reactions and then is discharged to the outlet of said exhaust manifold through the perforations in the inner cylinder of said cylindrical catalyst container,

the cylindrical catalyst container being replaceably mounted through said heat shielding liner and having in the upper portion thereof a cover member to be fitted in said upper casing and a lower portion disposed in alignment with the outlet of said exhaust manifold.

4,005,577

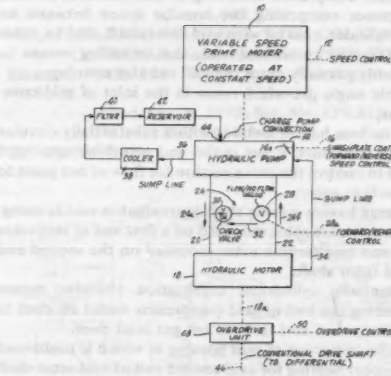
VEHICLE DRIVE UNIT UTILIZING HYDRAULIC PUMP AND MOTOR

Robert Haumaier, Mahopac, N.Y., assignor to Haumaier Automotive Energy Saver, Inc., Bedford Hills, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,441

Int. Cl.² F16H *39/46*

U.S. Cl. 60—431 **3 Claims**



1. An hydraulic drive system to power a drive shaft of a vehicle to be driven over a wide range of speeds, comprising an engine controlled to operate at a substantially constant speed during vehicle operation, engine speed control means for varying that speed of operation of said engine dependent upon a desired sub-range of operation within said wide range, an hydraulic pump powered by the engine and providing a maximum fluid output flow depending upon said engine speed and including pump flow control means for varying the flow of

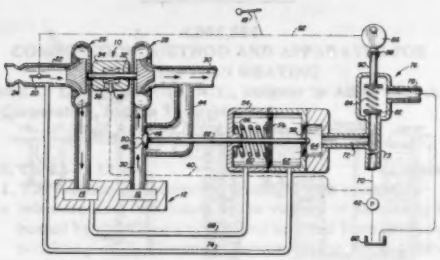
fluid output from the pump, an hydraulic motor receiving fluid output from the pump and driven thereby, and means coupling the hydraulic motor to the drive shaft of the vehicle to power that drive shaft which is driven over said sub-range of operation corresponding to the speed at which said engine operates.

4,005,578

METHOD AND APPARATUS FOR TURBOCHARGER CONTROL

Charles E. McInerney, Torrance, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Mar. 31, 1975, Ser. No. 564,005
Int. Cl.² F02D *23/00*; F02B *33/44*
U.S. Cl. 60—602 **20 Claims**



1. In combination with an internal combustion engine having an intake manifold, a turbocharger driven by flow of exhaust gases from said engine, and a throttle positionable to vary power developed by the engine, apparatus for controlling intake manifold pressure comprising:

a member exposed to said exhaust gas flow and movable to regulate exhaust gas flow through said turbocharger to vary said intake manifold pressure;

first sensing means for sensing said intake manifold pressure;

means responsive to said first sensing means and operably associated with said member for exerting a pneumatic force thereon in relation to intake manifold pressure, said pneumatic force urging said member to move in a direction decreasing intake manifold pressure;

second sensing means for sensing said throttle position;

a source of pressurized hydraulic fluid; and

means responsive to said second sensing means and operably associated with said source of fluid and said member for exerting a hydraulic force thereon in relation to throttle position, said hydraulic force opposing said pneumatic force and urging said member to move in an opposite direction increasing intake manifold pressure whereby said member moves substantially in response to the difference between said hydraulic and pneumatic forces to regulate said intake manifold pressure in relation to said throttle position.

4,005,579

TURBOCHARGER CONTROL AND METHOD

Richard J. Lloyd, Huntington Beach, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Mar. 31, 1975, Ser. No. 563,864
Int. Cl.² F02D *23/00*
U.S. Cl. 60—602 **18 Claims**

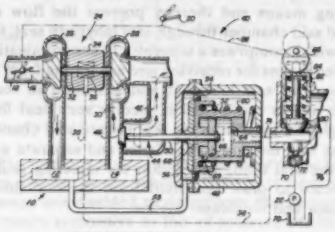
1. In combination with a turbocharger, an internal combustion engine having an intake manifold, an exhaust manifold, and a throttle positionable to vary power developed by the engine, said turbocharger comprising:

a turbine operably associated with said exhaust manifold to be driven by exhaust gas flow from the engine;

a compressor driven by said turbine and operably associated with said intake manifold to deliver gas flow thereto at a pressure which varies with the speed of said compressor;

a member exposed to said exhaust gas flow and movable toward an open position diverting exhaust gas flow from said turbine to reduce turbine speed and pressure developed in said exhaust manifold, said exhaust manifold pressure exerting a first force on said member urging the latter toward an open position;

means operably associated with said throttle and said member for exerting a second force on said member in relation to said throttle position, said second force opposing said first force to urge said member toward a closed position to increase turbine speed;



an element engageable with said member;

means operably associated with said intake manifold and said element for exerting a third force on said element in relation to the pressure in said intake manifold, said third force urging said element into engagement with said member to move the latter toward said open position; and

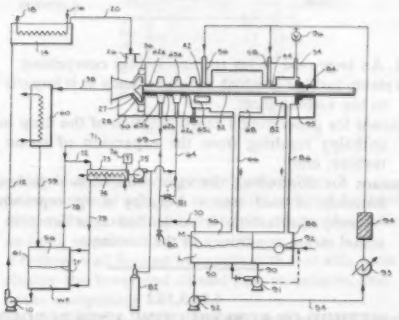
biasing means engaging said element to exert a biasing force on said element opposing said third force without acting upon said member, whereby said first force must overcome only said second force to move said member to said open position.

4,005,580

SEAL SYSTEM AND METHOD

Judson S. Swearingen, 2235 Carmelina Ave., Los Angeles, Calif. 90064

Filed June 12, 1975, Ser. No. 586,491
Int. Cl.² F01K *25/18*, *25/22*
U.S. Cl. 60—657 **17 Claims**



1. In a system including a working chamber closed to the exterior except for a working fluid inlet and outlet and a shaft passing through an opening in a wall of the chamber, said chamber containing a captive working fluid subject to being evaporated and condensed under pressures and temperatures within predetermined ranges to be employed in the system during operation, and a seal means for preventing escape of said working fluid from said chamber along said shaft, said

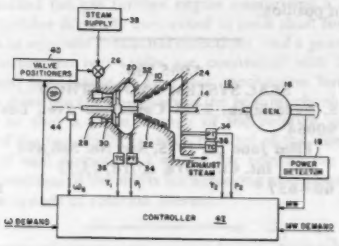
seal means comprising a lubricant type bearing seal spaced from said chamber with means for injecting lubricant into said bearing seal intermediate its extremities and under pressure greater than the working pressure within said chamber so that part of the lubricant injected will flow in said bearing seal toward said chamber, means for trapping lubricant flowing from said bearing seal toward said chamber before it reaches said chamber, a labyrinth type seal between said chamber and said trapping means, means for injecting a seal fluid into said labyrinth type seal with a portion of the labyrinth seal between the chamber and the point of such injection, and at a pressure great enough to cause the seal fluid to flow toward said chamber and thereby prevent escape of working fluid through said labyrinth type seal means to the point of injection of seal fluid, and cause part of the seal fluid to flow toward and into said trapping means and thereby prevent the flow of lubricant toward said chamber through said labyrinth seal, the improvement which comprises a separator in communication with said trapping means for receiving and separating from one another a mixture of said lubricant and seal fluid so received, condenser means connected to receive such seal fluid as flows through said labyrinth type seal toward said chamber, and for cooling said mixture to condense and separate working fluid from the seal fluid, said means for injecting seal fluid being connected to draw seal fluid from the seal fluid from said separator and condenser means.

4,005,581

METHOD AND APPARATUS FOR CONTROLLING A STEAM TURBINE

Ola J. Aanstad, Greensburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 24, 1975, Ser. No. 543,852
Int. Cl.² F01K *13/02*
U.S. Cl. 60—660 **59 Claims**



1. An improved steam turbine system comprising:

a steam turbine in which steam expands as it imparts torque to the turbine shaft;

means for generating a representation of the drop in steam enthalpy resulting from the expansion of steam in the turbine; and

means for controlling the operation of said turbine as a function of said steam enthalpy drop representation, whereby the turbine is controlled as a function of the actual steam conditions in the turbine.

4,005,582

METHOD OF CONSTRUCTING UNDERGROUND CONCRETE WALLS AND REINFORCEMENT CAGE THEREFOR

George John Tamaro, Leonia, N.J., assignor to ICOS Corporation of America, New York, N.Y.

Filed Aug. 12, 1975, Ser. No. 603,982
Int. Cl.² E02D *5/10, 27/00*
U.S. Cl. 61—35 **14 Claims**

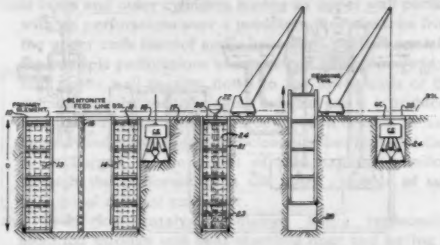
1. A method for the construction of a waterproof wall formed by interlocked horizontally elongated vertical concrete elements in the ground using as reinforcement connected flanged steel H-beam pairs comprising the steps of:

excavating at least a pair of elongated primary trench sections said primary sections being spaced apart at least a multiple of the length of each said primary section, each elongated primary trench excavation being carried out in the presence of a thixotropic liquid slurry,

reaming and smoothing the walls of at least one of said elongated primary trench excavations by lowering and raising a connected beam pair to thereby square off the ends and even out said walls,

inserting one connected flanged steel H-beam pair in each elongated primary trench section,

filling each said elongated primary trench section with concrete from the bottom up to form said primary wall panel sections,



and then excavating, in the presence of said thixotropic liquid slurry, the intermediate earth section between said pair of primary sections in at least two excavations, one of said two excavations using the flanged steel H-beam end in one of said intermediate earth sections as a guide with the opposite end of said one of said two excavations being unguided and at least another of said at least two excavations using the flanged steel H-beam end of the other of said at least two primary elements as a guide to thereby form a secondary wall excavation extending between said flanged steel H-beam ends,

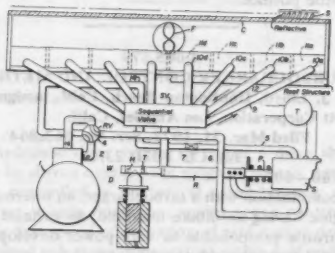
and displacing the thixotropic liquid from said secondary wall excavation by filling said secondary wall excavation from the bottom up with concrete to form a secondary wall panel section in the space between the two primary wall panel sections.

4,005,583

COMBINATION HEAT PUMP AND LOW TEMPERATURE SOLAR HEAT COLLECTOR

Harry Borders Ramey, Rte. 5, Box 272, Berea, Ky. 40403

Filed Dec. 5, 1974, Ser. No. 529,995
Int. Cl.² F25B *27/00;* **F24J** *3/02*
U.S. Cl. 62—2 **9 Claims**



1. A heat transfer means including a heat pump comprising a compressor having high and low pressure lines containing a

refrigerant, a heat exchange device, said heat exchange device having means forming separate compartments therein, a distinct mass of material in each of said compartments, heat transfer ducts disposed in heat exchange relation with said mass of material in each of said compartments, said heat transfer means including circulation means to conduct said refrigerant from said compressor through said lines and into said heat transfer ducts in heat exchange relation with said distinct masses in said heat exchange device, said circulation means including a second means to sequentially direct the refrigerant into only one of the heat transfer ducts while the other ducts are disconnected from said circulation means, and means to expose said compartments to the open sky including the portion of the sky encompassing the apparent path of the sun, thereby tending to restore the original level of heat energy to said disconnected portions.

4,005,584

COMPOSITION, METHOD AND APPARATUS FOR ABSORPTION HEATING

Chien C. Li, Williamsville, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 10, 1975, Ser. No. 567,043
Int. Cl.² F25B *15/00*
U.S. Cl. 62—112 **14 Claims**

1. The method of absorption heating which comprises:

a. releasing heat of solution in the vicinity of an area to be heated by absorbing a compound selected from the group consisting of dichloromonofluoromethane, monochlorodifluoromethane, trifluoromethane and monochloromonofluoromethane in an assymetrical furan ring containing compound having a boiling point between about 140° and 250° C. and the generic formula

wherein R_1 is independently at each occurrence H; lower alkyl; lower alkoxy; phenyl; lower alkylene phenyl; hydroxy containing lower alkyl; lower alkyl carboxy; alkoxy alkyl of from 2 through 6 carbon atoms; lower alkylene carboxylate of from 2 through 6 carbon atoms; fluorine or chlorine, *a* is independently at each occurrence an integer of 1 or 2; and Z is a single or double bond; provided that, when Z is a single bond, *a* is 2, when Z is a double bond, *a* is 1, and provided that the compound contains at least one R_1 group having an oxygen atom which has a single bond to a carbon atom,

b. heating the resulting solution to release said fluorocarbon from said solvent,

c. condensing released fluorocarbon to form liquid fluorocarbon,

d. evaporating the liquid fluorocarbon at a location removed from the vicinity of the area to be heated, and

e. returning the evaporated fluorocarbon to the vicinity of the area to be heated for reabsorption into said solvent.

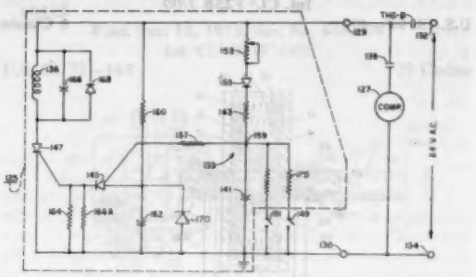
4,005,585

CONTROL ARRANGEMENT FAIL-SAFE TIMING CIRCUIT

Russell B. Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Division of Ser. No. 447,165, March 1, 1974, Pat. No. 3,970,864. This application June 9, 1975, Ser. No. 585,237
Int. Cl.² F25B *31/00*; G05D *23/32*
U.S. Cl. 62—158 **7 Claims**

1. In an air conditioning control arrangement for activating an air conditioning system, a fail-safe timing circuit energizable in response to a request signal to initiate the operation of a compressor for the air conditioning system, said fail-safe timing circuit comprising first switching means operable when enabled to activate the compressor to commence its operation tentatively second switching means, first timing means responsive to said request signal for controlling said second switching means to enable said first switching means, second timing means responsive to said request signal for generating a time-



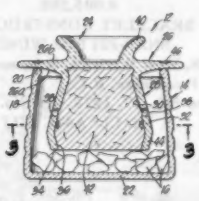
out signal after a predetermined time delay interval for inhibiting said first timing means whereby said first and second switching means are disabled to de-activate the compressor, and circuit means responsive to the oil pressure of the compressor becoming a predetermined value for preventing said second timing means from generating its time-out signal.

4,005,586

REFRIGERATED BUTTER DISH

Arthur Lyons, 646 Morongo Road, Palm Springs, Calif. 92262

Filed Mar. 11, 1976, Ser. No. 665,909
Int. Cl.² F25D *3/08, 3/02*
U.S. Cl. 62—372 **7 Claims**



1. A refrigerated butter dispenser comprising:

a. a first receptacle adapted to contain crushed ice having:

1. side walls terminating in an upper rim portion defining an open upper end; and

2. a bottom wall formed integrally with said side walls for closing the lower end of said first receptacle; and

b. a cover comprising:

1. a flange portion having first and second sides adapted to engage said upper rim portion of said first receptacle;

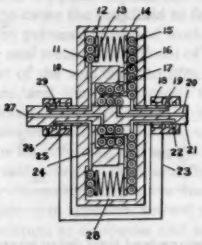
2. a skirt extending from said first side of said flange portion defining a second receptacle adapted to be telescopically received within the open upper end of said first receptacle; and

3. a handle extending from said second side of said flange portion for lifting the cover, said handle being receivable within the open upper end of said first receptacle.

4,005,587
ROTARY HEAT EXCHANGER WITH COOLING AND REGENERATION

Michael Eskeli, 7994-41 Locke Lee, Houston, Tex. 77042

Continuation-in-part of Ser. No. 474,729, May 30, 1974, and a continuation-in-part of Ser. No. 393,571, Aug. 31, 1973, Pat. No. 3,972,203. This application Oct. 1, 1975, Ser. No. 618,456
Int. Cl.² F25B 3/00
U.S. Cl. 62—401 6 Claims



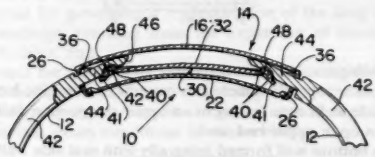
1. In a rotary heat exchanger wherein a compressible working fluid is circulated within a rotor outwardly in a first passage and inwardly toward center of rotation in a second passage, with the inward ends and outward ends of said passages connected by passage means to allow the circulation of said working fluid, and wherein a heat delivery heat exchanger is provided to remove heat from the working fluid during and after compression, and a heat source heat exchanger is provided to add heat into the working fluid during and after expansion, the improvement comprising:

a. a regenerative heat exchanger provided to exchange heat between two streams of the working fluid, with the working fluid stream leaving said heat delivery heat exchanger being in heat exchange relationship with the working fluid stream entering said heat delivery heat exchanger and being upstream of said heat delivery heat exchanger, and wherein a cooling means is provided to remove heat from said working fluid downstream of said heat source heat exchanger.

4,005,588
SPRING BRACELET CONSTRUCTION USING SNAP-FITTED WINGS

Max Marquardt, West Warwick, R.I., assignor to Marquardt-Hudes, Inc., Providence, R.I.

Filed Feb. 17, 1976, Ser. No. 658,848
Int. Cl.² A44C 5/12
U.S. Cl. 63—9 10 Claims

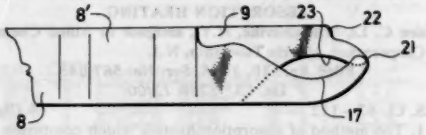


1. A bracelet-type construction comprising a pair of wings of a size and shape to engage around a body member and a hollow intermediate connecting head, each of said wings having a tongue extending from one end, said head having an opening at either end thereof for receipt of said tongues, a spring member positioned within said head and having an upwardly biased leaf extension at either end thereof proximate said head openings, said tongues and said leaf extensions cooperatively provided with mutually engageable detent and recess means whereby said tongues and leaf extensions are snap-fit interengaged each other so as to retain said wings in assembled position with said head and to normally bias said wings towards each other to a relatively closed position at their ends remote from said head, said wings being separately outwardly movable against the force of said spring member to a relatively open position at said remote ends wherein said tongues downwardly depress said leaf extensions.

4,005,589
KNITTING ELEMENTS

Pavel Uhlíř, Trebic, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi, Liberec, Czechoslovakia

Filed Nov. 27, 1974, Ser. No. 527,649
Claims priority, application Czechoslovakia, Nov. 28, 1973, 8181/73
Int. Cl.² D04B 35/02, 9/06
U.S. Cl. 66—95 7 Claims



1. In a knitting machine having a vertically grooved cylinder and a horizontally grooved dial, a plurality of needles each reciprocatingly mounted in the grooves of said cylinder, and a plurality of knitting elements each reciprocatingly mounted in the grooves of said dial to cooperate with associated ones of said needles to form knit work loops and to transfer said loops to said needles, said knitting elements comprising a pair of blade-like members arranged along one longitudinal edge in each of the respective grooves of said dial and being movable within said groove with respect to each other, one of said members having an operative end comprising an upwardly directed finger having a forward tip and spaced along the upper edge thereof with indentations thereon forming a front yarn receiving bed and a rear yarn receiving bed which serve to positively support the loops during the transfer operation, the second of said members having an operative end comprising a downwardly directed finger having a forward tip above the level of the surface of the front bed of said one member said second member having an upper edge rising from the tip thereof to the level above the rear bed of said one member and an indentation thereon forming a yarn receiving bed thereat and a lower edge forming with the front bed of said one member a space therebetween for gripping a yarn loop when the forward tips of each member are abreast of each other.

4,005,590
HANK DYEING

Nathan Cosh McLean, Shepshed, England, assignor to C.D.B. Europ, Villeneuve d'Ascq., France

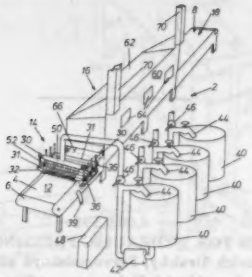
Filed Apr. 15, 1975, Ser. No. 568,376
Int. Cl.² D06B 1/02
U.S. Cl. 68—5 D 6 Claims

1. Dyeing apparatus comprising:

A. yarn conveying means comprising a longitudinally extending endless support having a plurality of longitudinally extending support elements for yarns arranged transversely across the support, the support elements being spaced transversely with respect to the endless support to permit dye liquor to pass between the support elements, and means for guiding and driving the support elements along an endless path;

B. dye liquor application means comprising a plurality of arrays of nozzles for expelling dye liquor under pressure, means for fixedly mounting the nozzles with respect to the longitudinal extent of said endless path and means for adjustably mounting the nozzles heightwise with respect

to said endless path to permit dye liquor to be expelled by the nozzles from a predetermined controllable height towards said endless support; a set of tubes for individually supplying dye liquor to the nozzles in each array, a respective manifold means for supplying liquor to each set of tubes collectively, a respective conduit pipe for supplying dye liquor to each manifold means, a respective pressure control means for controlling dye liquor flow through each conduit pipe a plurality of pumps and a



plurality of dye liquor tanks, one tank being associated with one of the pumps, one of the pressure control means, one of the conduit pipes and one of the manifold means to permit one pressure control means to control the flow of dye liquor through all of the tubes of a set of tubes simultaneously; and

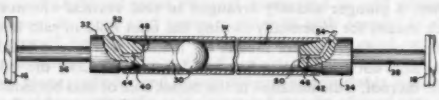
C. means mounted along the endless support downstream of the arrays of nozzles for fixation of the dye in the dye liquor.

4,005,591

BALL SIZING MACHINE AND METHOD

John A. Werner, Milwaukee, Wis., assignor to Besser Industries, Inc., Roanoke, Ill.

Filed Feb. 11, 1976, Ser. No. 657,178
Int. Cl.² B21B 17/06
U.S. Cl. 72—75 16 Claims



1. In a ball sizing machine wherein a ball is forced through a passageway in a workpiece to size the internal diameter of the passageway; the improvement comprising means for inserting said ball into a first end of said passageway, first and second retractable sealing means respectively engageable with said first and second ends of said passageway to seal the opposite ends of said passageway with said ball in said passageway adjacent said first end thereof, fluid pressure supply means, first means for filling said passageway with fluid from said supply means via second sealing means, second means responsive to the filling of said passageway by said first means for conducting fluid from said supply means at a given pressure into said passageway via said first sealing means and for draining fluid from said passageway via said second sealing means at a restricted rate to thereby establish a differential pressure in said passageway on opposite sides of said ball to drive said ball from said first end of said passageway to said second end, and third means responsive to the arrival of said ball at said second end of said passageway for retracting said sealing means from the respective ends of said passageway.

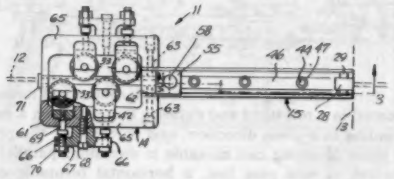
12. An improved method of sizing a passageway in a workpiece by moving a sizing member of substantially the configuration thereof, but of greater size, through it; the improvement comprising creating differential fluid pressure forces on opposite sides of the member which move the member at a controlled rate from the head end of the passageway to the tail end thereof.

4,005,592

STRIP AND WIRE STRAIGHTENER ROLL

Alfred H. K. Haeussler, 5841 W. 107th St., Chicago Ridge, Ill. 60415

Filed Dec. 12, 1975, Ser. No. 640,394
Int. Cl.² B21F 1/02
U.S. Cl. 72—165 20 Claims



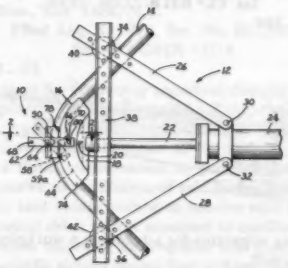
1. A straightening device for an elongated member comprising a fixed longitudinally elongated bottom support, upstanding post means on said bottom support, a plurality of spaced peripherally grooved bottom vertical rollers journalled transversely in said bottom support, a longitudinally extending block member overlying said bottom support and slidably engaging said upstanding post means, a pressure bar member pivoted to said upstanding post means and overlying said block member, said block member being formed with vertical guide means staggered relative to said bottom rollers, roller-positioning means in said guide means, respective peripherally grooved top vertical rollers rotatably engaged with the bottom ends of the positioning means, means connecting said roller positioning means to said pressure bar member, and means to exert downward force on said pressure bar member.

4,005,593

BENDING CLAMP

Harold D. Goldberg, Hazelcrest, Ill., assignor to Allied Tube & Conduit Corporation, Harvey, Ill.

Filed Aug. 20, 1975, Ser. No. 606,302
Int. Cl.² B21D 7/04
U.S. Cl. 72—213 7 Claims



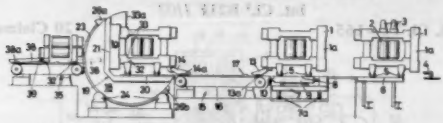
1. For use with an apparatus for bending pipe which includes a bending shoe having a curved bending surface for engagement with a pipe during bending of the pipe, said pipe bending apparatus having attaching pin means thereon, clamping means including a clamping block and a pair of attaching arms pivotally to said clamping block and releasably cooperable with said attaching pin means for releasably securing said clamping block to said bending shoe adjacent the apex of said bending surface, said clamping block being adapted to retain a pipe against the apex of said bending surface so as to prevent wrinkling, collapsing or flattening of the pipe adjacent said apex surface during bending of the pipe.

4,005,594

ROLL CHANGING MECHANISM FOR ROLLING MILLS

Erich Reth, Duisburg, and Hans Gockel, Mulheim (Ruhr), both of Germany, assignors to Demag Aktiengesellschaft, Duisburg, Germany

Filed Mar. 3, 1976, Ser. No. 663,287
Int. Cl.² B21B 31/08
U.S. Cl. 72—239 8 Claims



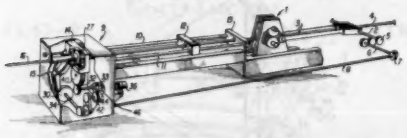
1. A roll changing mechanism for a rolling mill having rolls mounted in a roll stand and defining therebetween a pass line extending in a given direction, said mechanism comprising a roll stand changing cart movable in directions parallel to the direction of said pass line, a horizontal turntable on said changing cart having guideways thereon for receiving said roll stand, a swiveling frame adapted to have said roll stand supported therein, said swiveling frame being mounted for rotation in a vertical plane, first conveyer means extending on one side of said swiveling frame between said roll stand changing cart and said swiveling frame for engaging said roll stand and for moving said roll stand from said changing cart into said swiveling frame, said conveyer means including guideways for guiding said roll stand therebetween, and second conveyer means located on the opposite side of said swiveling frame and including guideways, said rolls including insert members enabling said rolls to be removed from said roll stand and to be moved along said guideways of said second conveyer means, said second conveyer means including means for engaging said insert members and for extending and retracting said insert members and said rolls from said roll stand along said guideways of said second conveyer means.

4,005,595

FEEDING WORKPIECE APPARATUS FOR COLD PILGER ROLLING MILLS

Josef Gerretz, Viersen, and Klaus Rehag, Rheydt, both of Germany, assignors to Wean United, Inc., Pittsburgh, Pa.

Filed Sept. 26, 1975, Ser. No. 616,978
Int. Cl.² B21B 17/06, 39/06
U.S. Cl. 72—250 11 Claims



1. A feeding apparatus for advancing a workpiece to a cold pilger rolling mill,

feed spindle means,

a workpiece feed carriage engaged for advance by said feed spindle means,

feed transmission means,

drive means,

means for connecting said feed transmission means to said drive means,

said feed transmission means having two drive lines for said feed spindle means,

a first of said drive lines being connected to gear means secured to said feed spindle means for producing a continuous rotational movement of said feed spindle means,

a second of said drive lines being connected to said feed spindle means by a lever for producing intermittent axial movement of said feed spindle means,

said feed spindle means comprising two feed spindles arranged on opposite sides of the rolling center of said mill,

a longitudinal movable transverse member for connecting said two feed spindles to one another,

axial-radial bearing means for each feed spindle mounted in said feed transmission means, and

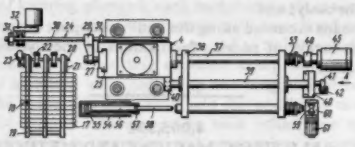
said lever arranged operably with said second drive line for acting on said transverse member.

4,005,596

APPARATUS FOR HYDRAULIC PRESSING OF METALS

Viktor Ivanovich Uralsky, Pervomaiskaya ulitsa, 82, kv. 71, and Vadim Leonidovich Kolmagorov, ulitsa Lenina, 101, kv. 6, both of Sverdlovsk, U.S.S.R.

Filed Apr. 7, 1975, Ser. No. 565,456
Int. Cl.² B21C 33/00, 35/00
U.S. Cl. 72—257 3 Claims



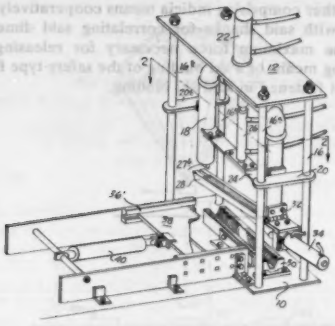
1. An apparatus for hydraulic pressing of metals, comprising a container; a vertical chamber provided in said container for being filled with hydraulic fluid; a horizontal chamber in said container communicating with said vertical chamber and having inlet and outlet holes axially aligned relative to each other; a plunger slidably arranged in said vertical chamber; lock means for repeatedly closing the inlet hole in said horizontal chamber; loader means for loading workpiece blanks into said horizontal chamber and located adjacent the inlet hole thereof; a die installed in the outlet hole of said horizontal chamber; a receiver means for receiving finished articles from said die, said receiver means being located adjacent the outlet hole in said horizontal chamber and comprising a framework consisting of two mutually parallel horizontal tubes and arms interconnecting the tubes at the ends thereof; a shaft rigidly connected to the arms of said framework and serving as an axis of symmetry of said framework; drive means for said shaft for turning framework in a vertical plane for successive axial alignment of each tube with the outlet hole in said horizontal chamber for discharge of a finished article into said tube during the pressing process, a ring installed in the outlet hole in the horizontal chamber at a location downstream of the die, said ring having a hole with a shape corresponding to that of the finished article for effecting additional shaping of the article and for sealing the outlet hole between the die and the end face of the tube which receives the finished article, a source of hydraulic pressure connected to said receiver means to produce a back pressure during the pressing process, said source communicating with the internal space of the respective tube, said receiver means further comprising an actuating cylinder axially aligned with the horizontal chamber of the container and including a rod with a cover at the end of said rod for sealing the internal space of the tube and for pressing the tube against said ring around said hole therein to effect the sealing between said tube and ring.

4,005,597

FILE FORMING PRESS

James A. Coon, 929 Drever St., West Sacramento, Calif. 95691

Filed Nov. 18, 1975, Ser. No. 632,913
Int. Cl.² B21D *5/02*
U.S. Cl. 72—380 **8 Claims**



1. A file forming press for bending toothed file blanks into their final form comprising; a base plate adapted to support a die and a top plate, means connecting said top and bottom plates, an inverted U-shaped vertically movable press element presenting downwardly extending arms and having pressing surfaces at the lower ends of said arms, hinge means secured at the lower end of one arm of said inverted U-shaped element, a die supported by said hinge so as to be normally in firm contact with said pressing surfaces, said hinge permitting said die to be pivoted downwardly away from the pressing surface remote from said hinge, a hydraulic piston and cylinder means operatively connecting said inverted U-shaped press element to said top plate adapted to lower and raise said inverted U-shaped press element from a lowermost to an elevated position, a pressure element including means to support a die mounted between and guided by the arms of said inverted U-shaped press element, a die mounted on said pressure element, a hydraulic cylinder and piston means mounted on said U-shaped press element connected to said pressure element to move said pressure element with respect to said U-shaped press element whereby said die mounted on said press element may be pressed against said die supported by said hinge, cylinder and piston rod means adjustably mounted on said hinge whereby said piston rod may be aligned with the said die mounted on said hinge, a die mounted on said base plate to cooperate with said die mounted upon said hinge, horizontal guide means mounted on one side of said base plate, a slidable bending plate mounted for horizontal movement in said guide means, and hydraulic cylinder and piston means operative to move said bending plate over said die supported by said inverted U-shaped press means when said die supported by said press means is in its lowermost position engaging said die mounted on said base plate.

4,005,598

PNEUMATIC BLIND RIVETER WITH CASCADED PISTONS

Hans Ehmann, Frankfurt am Main, and Günther Klein, Walldorf, Hessen, both of Germany, assignors to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung, Frankfurt am Main, Germany

Filed May 23, 1975, Ser. No. 580,328
Claims priority, application Germany, May 25, 1974, 2425385; May 25, 1974, 7418183[U]
Int. Cl.² B21J *15/34*
U.S. Cl. 72—391 **17 Claims**

1. A blind riveter comprising:

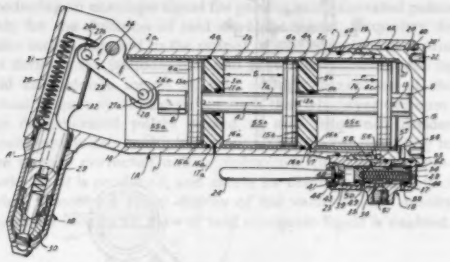
a housing having a front end and an opposite rear end and formed with an elongated chamber extending between said ends;

at least one piston longitudinally displaceable in said chamber;

a rivet-gripping chuck at said front end displaceable generally transversely to said chamber;

a pivot at said front end of said housing;

a lever pivotal on said pivot and having a relatively long arm extending from said pivot and having an outer end operatively engageable with said piston and a relatively short arm having an outer end engageable with said chuck, whereby a mechanical advantage effective on said chuck is gained by pivoting of said lever with said piston; and



means for pressurizing said chamber behind said piston and thereby displacing same toward said front end to pivot said lever and transversely displace said chuck,

said means including a collar longitudinally fixed but rotatable on said housing, and a control valve mounted on said collar operable to feed compressed air to said compartment through said collar.

4,005,599

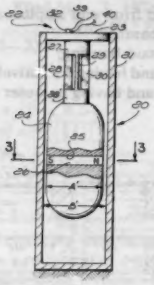
FLUID PROPERTY DETECTION SYSTEM

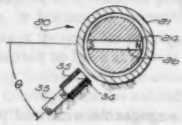
Gerald L. Schlatter, and Charles E. Miller, both of Boulder, Colo., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 5, 1975, Ser. No. 602,384
Int. Cl.² G01N *11/16*
U.S. Cl. 73—59 **11 Claims**

1. In a system for producing an output directly proportional to the magnitude of a property of a fluid, the combination comprising: an electromechanical oscillator including a body movably mounted in a manner to be at least partially immersed in a fluid, sensor means to produce a first periodic signal responsive to oscillation of said body, first means connected from said sensor means to receive said first periodic signal, electrical drive means mounted to oscillate said body, said first means including an amplifier and supplying second and third periodic signals having first and second frequencies, respectively, substantially equal to those of said first periodic signal at different corresponding times, said first means supplying said second and third periodic signals to said electrical drive means to cause the same to oscillate said body and to form a closed loop, said first means producing signals of frequencies f_a and f_b, the gain of said amplifier being adequate to cause said loop to have sustained oscillations at one of said first and second frequencies directly proportional to said frequencies f_a and f_b, said first means including a phase shifter connected to receive a signal of said first periodic frequency, said first means applying said second and third period signals to said electrical drive means alternately on a time shared basis, said second periodic signal, when applied, being in

phase with said first periodic signal, said third periodic signal, when applied, being out of phase with said first periodic signal;





and second means connected from said sensor means for producing an output p in accordance with the equation

$$p = [K]\left[\frac{f_h - f_n}{f_n}\right] - B$$

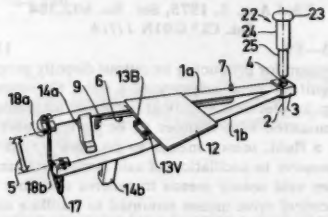
where K and B are constants.

4,005,600

APPARATUS FOR MEASURING THE RELEASE FORCE OF SAFETY SKI BINDINGS

Sivert Hoog, Nassjo, Sweden, assignor to Aktiebolaget Elof Malmberg, Gavle, Sweden

Filed Apr. 25, 1975, Ser. No. 571,519
Claims priority, application Sweden, May 6, 1974, 7405974
Int. Cl.² G01L 5/03
U.S. Cl. 73—133 A **11 Claims**



8. Apparatus for measuring the force required to release the heel and toe pieces of a safety ski binding releasably holding a ski boot on a ski, said apparatus comprising:

a force measuring tool;

a lever comprising two pivotally interconnected shanks extending from a common pivot point on said lever and having spaced apart free ends, said lever further including means connectable to said force measuring tool, and a depending projection on said lever located closer to said free shank ends than to said last-mentioned means for permitting pivotal movement of said lever about said projection in a vertical plane;

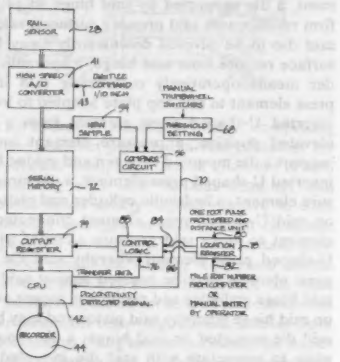
lifting means connectable to said free ends of said shank to extend therebetween beneath the heel portion of the ski boot for applying an upward force on the boot heel when a downward force is applied through said force measuring tool to said means connectable to said force measuring tool, whereby to measure the upward force required to release the boot heel from the heel piece of the binding; the free ends of said shanks comprising a pair of opposing projections for engaging the opposite sides of a part of the human body to define the transverse dimension thereof, and further comprising indicia means cooperatively associated with said shanks for correlating said dimension with the maximum force necessary for releasing said fastening means of a ski binding of the safety type from a ski boot fastened in said ski binding.

4,005,601

APPARATUS FOR DETECTING RAIL DISCONTINUITIES

Ramon J. Botello, Annandale, Va., assignor to AMAC, Inc., Springfield, Va.

Filed Aug. 29, 1975, Ser. No. 609,090
Int. Cl.² B61K 9/08
U.S. Cl. 73—146 **2 Claims**



1. A system for detecting rail discontinuities comprising:

I. at least one data channel having;

a. means for sensing a preselected type of rail discontinuity and generating an electrical signal indicative thereof;

b. means connected to an output of the sensing means for converting the signal from an analog form to a digital form;

C. storage means connected to an output of the converting means for storing data relating to a new sample interval;

d. register means connected in circuit with the output of the converting means for storing data relating to a new sample interval;

e. means for establishing a threshold level;

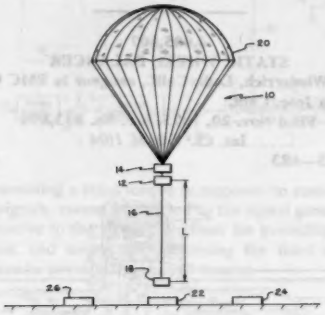
f. means connected to the output of the register means and the threshold means for comparing the contents of both; and

II. connecting means responsive to a preselected comparison by the comparing means for enabling the transfer of the new sample data from the storage means to a central processing unit.

4,005,602
APPARATUS FOR MEASURING HIGH ALTITUDE TEMPERATURES

Wallace J. Wilkie, P.O. Box 3, 7465 Plymouth Road, Ann Arbor, Mich. 48105

Filed Aug. 1, 1974, Ser. No. 493,513
Int. Cl.² G01W *1/00*; G01K *1/00*
U.S. Cl. 73—170 R 3 Claims



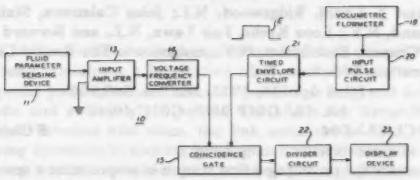
1. In apparatus for determining atmospheric temperatures which includes a device for emitting a sound signal, a sound receiving device for receiving a sound signal from said emitting device, aerodynamic decelerator means movably positioning said devices in the atmosphere, means fo detecting the initiation of a sound signal at the emitting device, means for detecting the reception of said sound signal at the receiving device, and means operable to continuously record the position of said sound emitting and receiving devices in the atmosphere;

the improvement comprising: cord means mounted on and extending away from said decelerator means, and sound emitting and sound receiving devices being mounted on said cord means so as to fix the relative positions of said sound emitting and sound receiving devices thereby facilitating the determination of the distance over which said signal has travelled between emission and reception at said sound receiving device.

4,005,603
APPARATUS FOR MEASURING FLUID FLOW

Yehuda Golahny, Newton, Mass., and Douglas A. Johns, Eden, N.Y., assignors to Airco, Inc., Montvale, N.J.

Filed Sept. 3, 1975, Ser. No. 610,495
Int. Cl.² G01F *1/86*
U.S. Cl. 73—194 M 3 Claims

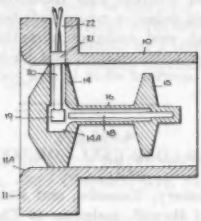


1. Apparatus for producing a density corrected measurement of the volumetric flow of a cryogenic liquid, the density of which varies inversely with respect to the temperature thereof comprising temperature sensing means adapted to be disposed in said cryogenic liquid; means for supplying a substantially constant energizing current to said temperature sensing means to develop thereacross a voltage having a magnitude which varies inversely with respect to the temperature of said cryogenic liquid; means coupled to said temperature sensing means for generating pulses at a frequency which varies directly with respect to the magnitude of said voltage; fluid flow detecting means for producing a signal which exhibits a discrete transition in response to each unit of volumetric flow of said cryogenic liquid; means responsive to said signal for producing an envelope signal of predetermined duration commencing upon the occurrence of said discrete transition, said duration being a predetermined multiple of the period of said generated pulses which period corresponds to a reference temperature of said cryogenic liquid; coincidence means coupled to said pulse generating means and to said means for producing an envelope signal for passing said generated pulses only for the duration of said envelope signal; frequency divider means coupled to the output of said coincidence means for dividing the frequency of said generated pulses passed by said coincidence means by said multiple regardless of the actual frequency of said pulses such that whenever the number of generated pulses passed to said frequency divider means equals said multiple, an output pulse corresponding to one density corrected unit of volumetric flow of said cryogenic liquid is produced; and means for displaying said output pulses whereby a visual display of the value of said density corrected volumetric flow of said cryogenic liquid is enabled.

4,005,604
NON-CONTACT SENSOR FOR VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Sept. 30, 1975, Ser. No. 618,277
Int. Cl.² G01F *1/32*
U.S. Cl. 73—194 VS 8 Claims



1. A non-contact sensor for a vortex-shedding flowmeter having an obstacle assembly mounted in a flow tube which intercepts the fluid passing therethrough and gives rise to vortices, to cause a deflectable section of the assembly to vibrate at a frequency proportional to the flow rate of the fluid, said assembly including a fixed section mounted across the flow tube, the deflectable section being cantilevered from the fixed section by a hollow, flexible beam, said sensor comprising:

A. a magnetically-dependent device which when subjected to a varying magnetic field produces a corresponding varying electrical value, said device being disposed within a cavity in said front section which communicates with said hollow beam and is accessible by way of a passage extending through said fixed section and said tube, and

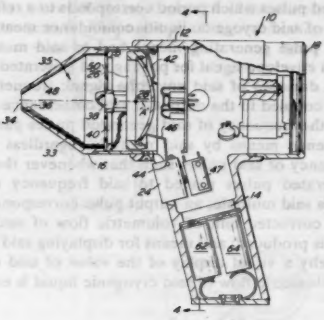
B. a proximity element enclosed in said hollow beam mechanically coupled to said deflectable section and vibrating therewith, the free end of said element being disposed adjacent to said device in said cavity but out of contact therewith and being adapted to vary the magnetic field to which the device is subjected in accordance with said vibrations, whereby the device produces a signal indicative of said flow rate.

4,005,605

REMOTE READING INFRARED THERMOMETER

Donald S. Michael, Ridgewood, N.J., assignor to Mikron Instrument Company, Inc., Ridgewood, N.J.

Filed July 22, 1974, Ser. No. 490,883
Int. Cl.² G01J 5/00
U.S. Cl. 73—355 R 9 Claims



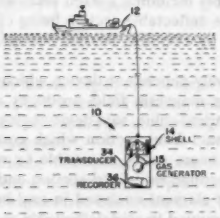
1. In a remote reading infrared theremometer having a housing defining a cavity, an aperture in said cavity for admitting to said cavity radiation emanating from a target object, radiation detector means disposed in said cavity, and radiation directing means disposed in said cavity for selectively directing toward said detector means ambient radiation from within said cavity and then radiation emanating from a target object of unknown temperature outside said cavity, and manually operable means coupled to said radiation directing means for moving said radiation directing means from a first position wherein said radiation directing means directs toward said detector means ambient radiation from within said cavity and a second position wherein said radiation directing means directs toward said detector means radiation emanating from said target object, said radiation directing means being a mirror of concave cross-section, and having its optical axis aligned with said aperture when in said second position.

4,005,606

SUBMERSIBLE LOAD CELL FOR MEASURING GAS BUOYANCY

Herbert L. Mummery, Kaneohe, and Robert T. Hoffmann, Kailua, both of Hawaii, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 29, 1975, Ser. No. 617,912
Int. Cl.² G01N 9/12
U.S. Cl. 73—438 10 Claims



1. A submersible load cell for measuring gas buoyancy comprising:

a rigid shell which has an open bottom so that gas can be introduced therein to make the shell positively buoyant;

means supporting the shell for vertical movement so that a change in buoyancy results in the shell exerting a corresponding upward force;

at least one hydraulic actuator mounted between the support means and the shell for registering a pressure which corresponds to the degree of upward force or positive buoyancy of said shell; and

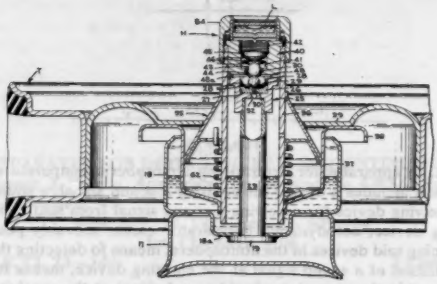
means connected to the hydraulic actuator for indicating the change in buoyancy of the shell as gas is introduced therein.

4,005,607

STATIC WHEEL BALANCER

James L. Wiederrich, Lodi, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Nov. 20, 1975, Ser. No. 633,894
Int. Cl.² G01M 1/04
U.S. Cl. 73—483 4 Claims



1. In a wheel balancer of the type comprising a post having a generally vertical axis, means for supporting said post on the floor, pivot ball support means on an upper portion of said post, a wheel balance head having means for mounting and centering a wheel to be balanced in a plane that is normally horizontal, a level on said head, and means for mounting a pivot ball on said balance head for support by the ball support means on said post; the improvement wherein said pivot ball mounting means comprising a pivot ball socket member on an upper portion of said balance head, metallic spring means comprising an assembly of Belleville washers in said socket member and engaging an upper portion of said pivot ball, and means for preloading said spring means against said ball, for absorbing shock loads imparted to said balance head, said preloading means comprising a threaded plug in said socket member for adjusting the preload of said Belleville washers.

4,005,608

ELECTRICALLY CONTROLLED RATE INTEGRATING DEVICE

Michael J. Lanni, Ridgewood, N.J.; John Calamera, Staten Island, N.Y.; Leon Krebs, Fair Lawn, N.J., and Bernard J. O'Connor, Eastchester, N.Y., assignors to The Bendix Corporation, Teterboro, N.J.

Filed Apr. 15, 1975, Ser. No. 560,900
Int. Cl.² G01P 9/02; G01C 19/42
U.S. Cl. 73—504 5 Claims

1. A sensor system, comprising:

a sensor for providing a first torque in response to a sensed condition;

means for providing a second torque;

a displaceable load;

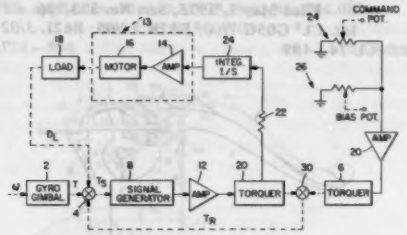
means for combining the first and second torques and the load displacement;

a signal generator connected to the combining means and responsive to the combined first and second torques and load displacement for providing a corresponding signal;

means connected to the signal generator and responsive to the signal therefrom for providing another signal;

means connected to the last mentioned means and connected to the load, and responsive to the signal from the last mentioned means for displacing the load; and

the means for providing a second torque including means



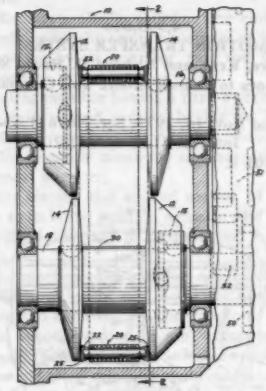
for providing a third torque in response to command and bias signals, means connected to the signal generator and responsive to the signal therefrom for providing a fourth torque, and means for combining the third and fouth torques to provide the second torque.

4,005,609

AUTOMATIC VARIABLE SPEED TRANSMISSION

Wilfrid H. Bendall, 12 Castle Hill Road, Pawcatuck, Conn. 02891

Filed Jan. 19, 1976, Ser. No. 650,167
Int. Cl.² F16H *55/52, 55/56, 13/02*
U.S. Cl. 74—230.17 S **9 Claims**



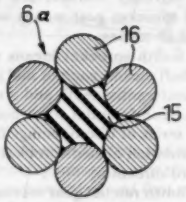
1. An automatic variable speed transmission comprising a housing containing a lubricating medium and having axially opposed pairs of conical discs on parallel driving and driven shafts and a loosely pin-jointed link chain for transmitting torque between said discs, the link members of said chain having apertures in rocking bearing contact with the pins and having traction members on extended pin end portions for engaging the discs, said chain being in transversely compressed traction therebetween, said traction members having coacting edge portion holding them in alignment with each other and having an internally conical traction engagement surface adapted to collect and wedge the lubricating medium between the traction member and disc engagement surfaces, one disc of each opposed pair being axially movable relative to the other and having torque responsive means adapted to automatically vary the chain engagement pitch diameter and disc traction pressure by moving the discs in response to varying driving and driven shaft torques, said chain initially being out of full engagement contact with one of said disc pairs when rotation is started, to permit a graduated, wedged lubricant engagement therewith.

4,005,610

CONVEYOR BELT

Harald Simonsen, Ludersen; Hans Specht; Klaus Baumgärtel, both of Berenbostel, and Hans Meumann, Hannover, all of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Continuation-in-part of Ser. No. 337,129, March 1, 1973, abandoned. This application Mar. 27, 1975, Ser. No. 562,543
Claims priority, application Germany, Mar. 1, 1972, 2209752
Int. Cl.² F16G *1/22*
U.S. Cl. 74—237 **8 Claims**



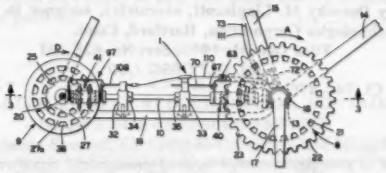
1. A conveyor belt of elastomeric material for transport purposes, especially rubber material, which includes in combination strength members arranged substantially parallel and in transversely spaced relationship to each other and extending in the longitudinal direction of said belt while being embedded directly in bonding connection with the elastomeric material of the belt to lessen weight, said strength members consisting only of individual bare strands as conveyor belt inserts each composed of a plurality of finished wires united to each other about a solid core support member by a single twist in a preliminary product formed by rotating together several individual solid elements thereof.

4,005,611

CHAINLESS BICYCLE DRIVE MECHANISM

Warren E. Jeffries, 4859 Cheyenne Ave. SE., Canton, Ohio 44707

Filed Apr. 5, 1976, Ser. No. 673,665
Int. Cl.² F16H *1/12;* **B62M** *9/00*
U.S. Cl. 74—416 **20 Claims**



1. A multispeed, chainless drive mechanism for a bicycletype vehicle including:

a. a drive disc mounted on a pedal actuated crankshaft of the vehicle for rotation with said crankshaft, said drive disc being formed with a pair of circularly arranged series of openings concentric with the crankshaft;

b. a driven disc mounted on a rear wheel of the vehicle for rotation with said rear wheel, said driven disc being formed with a pair of circularly arranged series of openings concentric with the axis of the rear wheel;

c. rigid drive shaft means extending between the drive and

driven discs for transmitting the rotating force from the crankshaft to the vehicle rear wheel;

d. first and second sprocket means rotatably mounted on the drive shaft means, each of said sprocket means having outer circumferential teeth and a series of ratchet teeth, with said circumferential teeth being engageable with a respective series of disc openings for rotating said sprocket means upon rotation of the drive disc in a forward direction;

e. first and second ratchet gear means mounted on the drive shaft means and operatively engageable with the first and second sprocket means, respectively, with said ratchet gear means being rotatable with the drive shaft means and axially movable with respect thereto;

f. first shift means operatively engageable with the first and second ratchet gear means for selectively engaging one of said ratchet gear means with the ratchet teeth of its respective sprocket gear means by movement of the selected ratchet gear means axially along the drive shaft means to drivingly connect the selected ratchet gear means and sprocket gear means with the drive disc and the drive shaft means;

g. third and fourth sprocket means rotatably mounted on the drive shaft means, each of said sprocket means having outer circumferential teeth and a series of ratchet teeth, with said circumferential teeth being engageable with a respective series of disc openings for rotating said driven disc upon rotation of said sprocket means and drive shaft in a forward direction;

h. third and fourth ratchet gear means mounted on the drive shaft means and operatively engageable with the third and fourth sprocket means, respectively, with said ratchet gear means being rotatable with the drive shaft means and axially movable with respect thereto; and

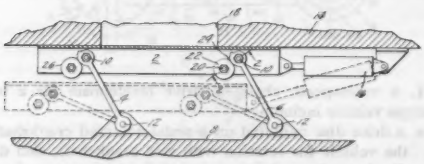
i. second shift means operatively engageable with the third and fourth ratchet gear means for selectively engaging one of said ratchet gear means with the ratchet teeth of its respective sprocket gear means by movement of the selected ratchet gear means axially along the drive shaft means to drivingly connect the drive shaft means with the driven disc for imparting rotation to the vehicle rear wheel upon rotation of the drive shaft means.

4,005,612

PRELOADED ANTI-RATTLE DEVICE

Leander H. Lippincott, deceased, late of Middletown, Conn. (by Dorothy M. Lippincott, executrix), assignor to United Technologies Corporation, Hartford, Conn.

Filed Oct. 31, 1975, Ser. No. 628,161
Int. Cl.² G05G 1/00
U.S. Cl. 74—470 **7 Claims**



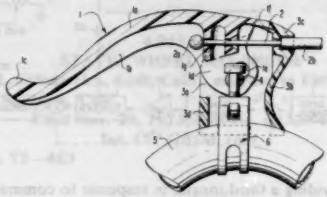
1. An anti-rattling device for a linkage including:
a pivoted arm forming part of the linkage,
a member on which the arm is pivoted, and
a compressible roller also mounted on the member adjacent to the arm and engaging the latter on an external surface surrounding the pivot point.

4,005,613

BRAKE OPERATING LEVER

Alan D. Kaufman, Williamsport; Arne M. Reistad, Jr., Philadelphia, and David J. Wilke, York, all of Pa., assignors to Pennsylvania Wire Rope Corporation, Williamsport, Pa.

Filed May 2, 1975, Ser. No. 573,926
Int. Cl.² G05G 7/00; B62K 23/06; B62L 3/02
U.S. Cl. 74—489 **7 Claims**



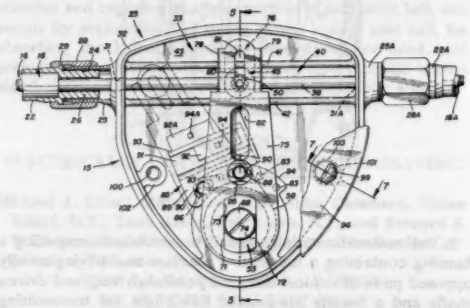
1. An operating lever for a cable actuated bicycle brake comprising, a housing connected to a bicycle handle bar, a lever connected to one end of the brake actuating cable, and pin and slot means connected between the lever and the housing for pivotally connecting the lever to said housing, said lever having an edge portion adapted to abut an edge portion on the housing, the tension of the cable maintaining the lever in the operative position while in said abutting position with said pin means being disposed at one end of said slot means, the lever being movable from the operative, abutting position to the inoperative position within the housing wherein the pin means is disposed at the opposite end of the slot means, to thereby slacken the cable.

4,005,614

MOTION TRANSFER SYSTEM

Bruce H. Moore, Kent, and Richard D. Houk, Stow, both of Ohio, assignors to Samuel Moore and Company, Mantua, Ohio

Filed Nov. 13, 1975, Ser. No. 631,634
Int. Cl.² F16C 1/12, 1/20
U.S. Cl. 74—501 R **11 Claims**

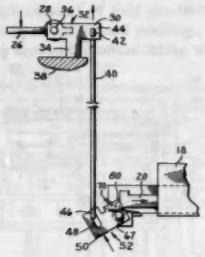


1. A system for transferring motion between locations remote with respect to each other by a push-pull control cable assembly, said system having a motion conversion unit comprising: a housing, shaft means rotatably mounted in said housing, a throw arm secured to said shaft means and movable within said housing, a core element included in said push-pull control cable assembly and extending within said housing, means to rigidify that portion of said core element extending within said housing, a crosshead secured to said rigidified portion of said core element and means to effect linear movement of said crosshead in response to rotational movement of said throw arm.

4,005,615
RESET FOR THREADED ENCLOSURE

Christian De Visser, Clinton, Ill., assignor to General Electric Company, New York, N.Y.

Continuation of Ser. No. 410,956, Oct. 29, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,087
Int. Cl.² G05G 1/08
U.S. Cl. 74—504 5 Claims



1. In a threaded explosion proof enclosure for motor starting devices, the combination of a rigid elongated flat support member mounted within said enclosure, an overload relay mounted on said support member, said overload relay having a reset button extending therefrom, and reset means for depressing said reset button to reset said overload relay comprising:

a. a handle mounted external to said enclosure for enabling said overload relay to be reset from outside of said enclosure;

b. a rod mounted for reciprocal movement within said enclosure;

c. means for mechanically coupling one end of said rod to said handle, whereby upon movement of said handle in a first direction by an operator, said rod moves from an initial position to a reset position;

d. an actuating member having a first, a second and a third section, said second section having an initial position adjacent said reset button of said overload relay;

e. means for pivotally mounting said actuating member to said support member;

f. means for biasing said second section of said actuating member to its initial position adjacent said reset button of said overload relay and to hold said rod in its initial position;

g. means for mechanically coupling another end of said rod to said first section of said actuating member, whereby when said rod is moved by said handle to the reset position, said second section of said actuating member depresses said reset button to reset said overload relay, and when said handle is released by the operator, said second section of said actuating member is returned by said biasing means to its initial position adjacent said reset button and said rod is returned to its initial position; and

h. said means for mechanically coupling said rod to said actuating member further comprising:

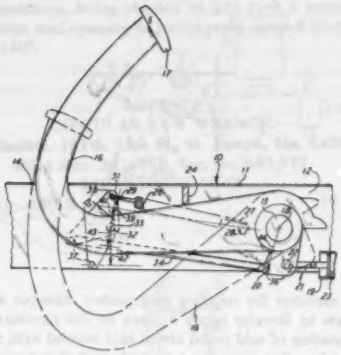
1. said other end of said rod constituting a hook section; and

2. said first section of said actuating member having an aperture for receivinng and engaging said hook section of said rod, said aperture in said first section being elongated to have a major axis longer than the bight of said hook section of said rod, whereby when said rod is in its initial position, and said actuating member is manually moved by the operator to depress said reset button until the major axis of said aperture in said first section is aligned with the plane of said hook section, said hook section is removable from said first section of said actuating member to facilitate the removal of said support member from said enclosure.

4,005,616
FOOT PEDAL ASSEMBLY WITH A RETURN SPRING

Thomas Patrick Casey, Burlington, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Aug. 11, 1975, Ser. No. 603,633
Int. Cl.² G05G 1/14
U.S. Cl. 74—512 5 Claims



1. A foot pedal assembly with a return spring, comprising a foot pedal having a pivotally mounted arm pivotal relative to a fixed axis for pivotal movement of said foot pedal between a depressed position and a return position, a lever pivotally mounted adjacent said arm and having a pivot axis and two ends disposed on opposite sides of said pivot axis, a longitudinal link interconnected with one of said two ends of said lever and with said arm for pivoting said lever in accordance with and in response to pivotal movement of said foot pedal and to have said lever pivot in one direction when said pedal is depressed, and a longitudinal return spring connected with the other end of said two ends of said lever for yieldingly urging said link in the direction to pivot said foot pedal to its said return position, the location of the connection of said spring with said lever is related to said pivot axis of said lever with said connection of said link being located in the said one direction of pivot of said lever and from the plane along the shortest line from said pivot axis to the longitudinal center line of said spring, and with the location of the connection of said link with said lever being related to said pivot axis of said lever with said connection of said link being located against the said one direction of pivot of said lever and from the plane along the shortest line from said pivot axis to the longitudinal center line of said link, and with said connections being so located that the moment arm of said link and said spring relative to said lever respectively increase and decrease in accordance with pivotal movement of said foot pedal toward its said depressed position.

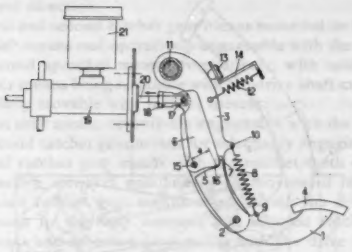
4,005,617
VARIABLE FORCE REDUCING PEDAL CONTROL DEVICE FOR PRESSURE EMITTER

Jean-Claude Sourbel, La Garenne-Colombes, and Michel Guettier, Rueil Malmaison, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Societe Anonyme Dite: Automobiles Peugeot, Paris, both of, France

Filed July 14, 1975, Ser. No. 595,984
Claims priority, application France, July 18, 1974, 74.25072
Int. Cl.² G05G 7/04
U.S. Cl. 74—516 5 Claims

1. A pedal control device with variable reduction for a pressure elevator comprising a lever mounted for pivotal movement about a first axis, a pedal pivotally mounted on said lever for movement about a second axis spaced from said first

axis, first stop means limiting movement of said lever in one direction and spring means resiliently urging said lever against said first stop means, a pusher member pivotally mounted on said lever for limited movement about a third axis spaced from said first and said second axes, said pusher member being operably connected to the pressure elevator for commanding actuation thereof, and means on said pedal engaging said



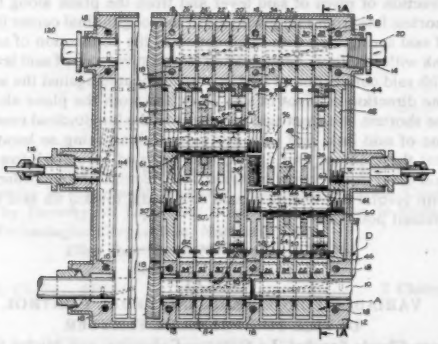
pusher member for rotating said pusher member about said third axis to thereby apply a force to the pressure elevator upon rotation of said pedal about said second axis, said lever, pedal and pusher acting as a unit pivoted about said first axis and without relative movement therebetween when force applied to the pressure elevator exceeds the resistance of said spring means.

4,005,618

TRANSMISSION WITH CONTINUOUSLY VARIABLE SPEED RATIO

William A. Cohen, Brooklyn, N.Y., assignor to Sphero International Co., Brooklyn, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,365
Int. Cl.² F16H *33/00*
U.S. Cl. 74—640 **15 Claims**



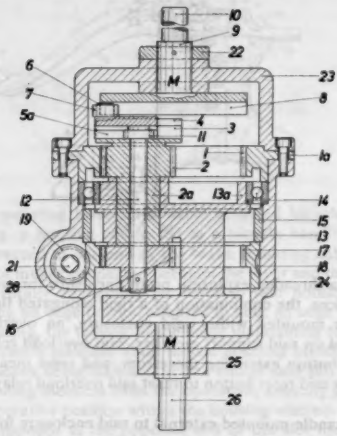
1. A transmission for transmitting torque from a drive gear to a driven gear comprising a composite ring gear operatively connecting said drive and driven gears, said ring gear comprising first and second ring gear sectors, a rotatable element, each of said sectors being mounted on a different end of said element such that when one sector engages said drive gear the other sector engages said driven gear and means operatively connected to said element for varying the position of the axis of rotation of said element relative to said drive and driven gears to change the ratio of the distances between the axis of rotation of said element and the drive and driven gears, respectively.

4,005,619

STEPLESSLY SETTABLE ELLIPTICAL GEARING

Alfred Schmermund, 62, Kornerstrasse, 5820 Gevelsberg, Germany

Filed Oct. 15, 1975, Ser. No. 622,793
Claims priority, application Germany, Oct. 19, 1974, 2449773
Int. Cl.² F16H *1/28*
U.S. Cl. 74—804 **10 Claims**



1. A gear box comprising in combination:
a housing;
an input shaft extending into said housing;
an output shaft extending into said housing;
a first internally toothed annular gear fixedly secured to said housing;
a first spur gear coupled to said input shaft and disposed within said first internally toothed annular gear to rollably engage the teeth thereof;
a second internally toothed annular gear supported by said housing to be angularly settable with respect thereto;
a second spur gear disposed within said second internally toothed annular gear to rollably engage the teeth thereof; and
a sliding head element disposed within said housing and slidably supported on said first spur gear, said head element being coupled to said output shaft and being steplessly displaceable relative thereto through said second spur gear in dependence upon the angular setting of said second internally toothed annular gear.

4,005,620

HYDRAULIC GEAR-SHIFT CONTROL FOR AUTOMOTIVE TRANSMISSION SYSTEMS

Hansjörg Dach, Friedrichshafen, and Robert Marion, Lindau, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

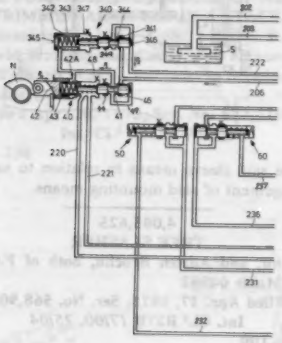
Filed Apr. 23, 1975, Ser. No. 570,773
Int. Cl.² B60K *41/18*
U.S. Cl. 74—865 **10 Claims**

1. In a hydraulic load-control system for driving an output shaft from a fuel-powered engine with a variable torque ratio, including an operator-controlled accelerator for varying the fuel supply to said engine, a source of high-pressure fluid, drive-establishing means shiftable under fluid pressure from said source between torque ratios, and fluid-actuatable switchover means for controlling said drive-establishing means, the combination therewith of:
first pressure-modulating means connected to said source for producing a fluid pressure varying generally propor-

tionally to the speed of said output shaft, said first pressure-modulating means communicating with said switchover means for actuating same in an upshifting sense;

biasing means for said switchover means opposing upshifting, said biasing means including second pressure-modulating means connected to said source;

third pressure-modulating means connected to said source for producing a fluid pressure varying generally proportionally to load in an upper part of a load range as determined by a displacement of said accelerator from a retracted position to an advanced position, said third pressure-modulating means communicating with said switch-



over means for creating a hysteresis effect with upshifting at higher loads and downshifting at lower loads; and

fourth pressure-modulating means connected to said source for producing a fluid pressure rising with increasing load in a lower part of the load range and remaining substantially constant in the remainder of said load range, said fourth pressure-modulating means communicating directly with said drive-establishing means for moderating the actuation thereof by said switchover means and further communicating with said second pressure-modulating means for progressively increasing the output pressure thereof in said lower part of the load range.

4,005,621

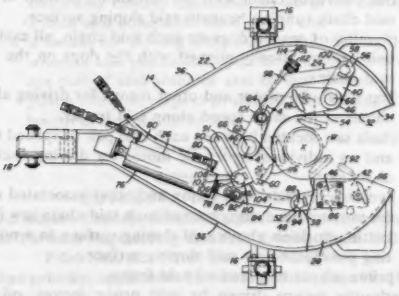
DRILLING TONG

John W. Turner, Jr., and Russell A. McLaughlin, both of Houston, Tex., assignors to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Apr. 27, 1976, Ser. No. 680,604

Int. Cl.² B25B *17/00*

U.S. Cl. 81—57.2 **16 Claims**



1. A gripping tong comprising: a main body housing having an interior cavity in open communication with a forwardly open member receiving opening; a plurality of at least three pivotal tong jaws having free member ends and received within said interior cavity in spaced relationship to each other about the periphery of said member receiving opening; means for selectively pivoting said tong jaws through a range of positions including a fully retracted position and member gripping positions; said tong jaws, in said fully retracted position, being retracted from said opening at least a sufficient amount to permit a member to be received within said opening; and said free ends of said tong jaws, in said member gripping positions, being pivoted to grip such a member received within said opening at peripherally spaced intervals of less than 180°.

4,005,622

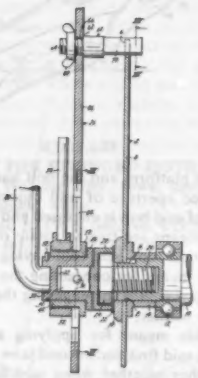
CIRCULAR SAW WRENCH

Alvin L. Bassett, 102 S. 13th St., St. Joseph, Mo. 64501

Filed Apr. 30, 1976, Ser. No. 681,917

Int. Cl.² B25B *13/48*

U.S. Cl. 81—180 R **10 Claims**



1. A wrench for tightening or loosening the central mounting screw of a circular saw blade, said wrench comprising:

a. first and second elongated lever handles,

b. pivot means connecting said lever handles together for relative angular movement about an axis transverse to said lever handles,

c. a wrench socket carried fixedly by the first of said lever handles, said socket opening coaxially with said pivotal axis and being operatively engageable over the head of said mounting screw, and

d. a restraining finger fixed to the second of said lever handles, being parallel to but spaced apart from said pivotal axis, and being adapted, when said wrench socket is applied to said mounting screw, to project between a consecutive pair of teeth of said saw blade.

4,005,623

FASTENER APPARATUS

Charles C. Faroni, Summit, N.J., assignor to Assembly Line Products, Inc., Hinsdale, Ill.

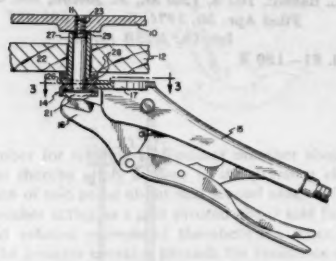
Division of Ser. No. 438,851, Feb. 1, 1974, which is a continuation of Ser. No. 341,824, March 16, 1973, abandoned. This application June 11, 1975, Ser. No. 586,030

Int. Cl.² B25B *7/02*

U.S. Cl. 81—426 **2 Claims**

1. Fastener apparatus for attaching an object having a threaded aperture to a platform having parallel surfaces proximal and distal to said object and having a through aperture in alignment with said threaded aperture, the apparatus comprising:

1. a shoulder bolt having a head and a shank, at least a portion of said shank being threaded for mating with said threaded aperture, said head having a smooth non-wrenchable surface;
2. a cup washer adapted to be rotatably mounted on the shank of said bolt and having side walls partially enclosing the head of the bolt when the cup washer is positioned adjacent said head, the side walls having bearing surfaces thereon for receiving an externally applied force in a direction parallel to the longitudinal axis of the bolt when the cup washer is so mounted;
3. sheathing means adapted to be rotatably mounted on the shank of said bolt and of such a length that when said bolt and sheathing means are inserted into the through aperture of said platform and the bolt has been threaded into the threaded aperture of said object substantially all of the shank of said bolt is enclosed and said cup washer and sheathing means are free to rotate on said shank; and



4. an installation tool, said tool having
   a. first jaw means for contacting the head of said bolt;
   b. second jaw means for engaging the bearing surfaces of said cup washer;
   c. releasable means for applying a compressive force between said first and second jaws to hold said bolt and cup washer together when said first and second jaws are engaged with said head and bearing surfaces, respectively; and
   d. means for applying a torquing moment to said second jaw means.

4,005,624

METAL PEELING MACHINE WITH MOVABLE CLAMPING CARRIAGE

Alfons Goeke, and Franz Riedel, both of Solingen, Germany, assignors to Th. Kieserling & Albrecht, Solingen, Germany

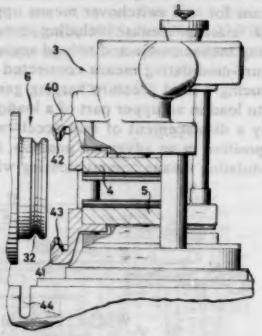
Filed May 13, 1975, Ser. No. 576,979

Claims priority, application Germany, May 14, 1974, 2423210

Int. Cl.² B23B *5/00*; **B23P** *19/00*; **B23Q** *7/00*

U.S. Cl. 82—20 **7 Claims**

1. In a metal peeling machine for workpieces such as rods and tubes comprising:
   a machine bed and a machine housing therefor;
   a workpiece clamping carriage movably mounted relative to said bed;
   a workpiece cutting means mounted on said bed;
   workpiece guide sleeve means arranged for stationary position adjacent to said cutting means and movement relative to said bed, and arranged adjacent to said clamping carriage and projecting into said machine housing;
   disengageable mounting means securing said sleeve in fixed relation to said bed;
   and clamping arrangement mounting and dismounting means secured to said clamping carriage and axially movable therewith for clamping engagement with said sleeve



to move said sleeve means in relation to said bed after disengagement of said mounting means.

4,005,625

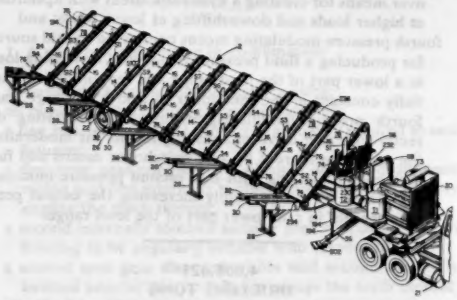
TREE SLASHER

André Brochu, and Adrien Brochu, both of P.O. Box 332, Stratton, Maine 04982

Filed Apr. 17, 1975, Ser. No. 568,902

Int. Cl.² B27B *17/00, 25/04*

U.S. Cl. 83—100 **15 Claims**



1. A tree slasher comprising s supporting frame, a transversely upwardly sloping surface carried by said frame and whose long dimension is more or less as long as the tree to be cut,
   said surface being interrupted at selected intervals with pairs of spaced tracks in each of which resides a continuous conveyor chain with the remaining portion of each said chain running beneath said sloping surface,
   a plurality of spaced dogs on each said chain, all said dogs being longitudinally aligned with the dogs on the other said chains,
   a first hydraulic motor and other means for driving all said chains at the same speed along said tracks,
   a chain saw located between each said pair of spaced tracks and an individual hydraulic motor for driving each said chain saw,
   a hydraulic cylinder and piston and other associated means for moving the cutting part of each said chain saw from a cutting position above said sloping surface to a non-cutting position below said sloping surface,
   a prime mover mounted on said frame,
   hydraulic pumps driven by said prime mover, oil tanks supplying said pumps,
   hydraulic pipe lines running from one of said pumps to said first hydraulic motor which drives said conveyor chains,
   other hydraulic pipe lines running from other pumps to said individual hydraulic motors which drive said chain saws,

other hydraulic pipe lines running from one of said pumps to said hydraulic cylinders and pistons which control the positions of said chain saws,

manually operable means for controlling the operation of said first hydraulic motor that drives said conveyor chains,

and manually operable means for actuating selectively each hydraulic cylinder and piston for positioning each said saw.

4,005,626

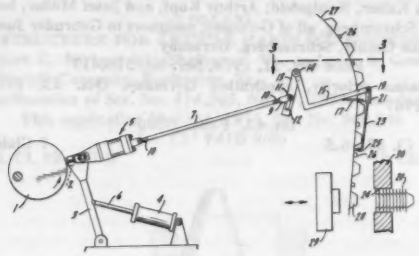
MACHINE FOR INDEXING GROUPS OF NESTABLE TRIMMED ARTICLES IN A STACK

Allen H. Bateman, Chippewa Falls; Charles B. Case, Eau Claire; David W. Kragness, Colfax, and Edward C. LeDuc, Chippewa Falls, all of Wis., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 28, 1975, Ser. No. 572,219

Int. Cl.² B26D *7/06*

U.S. Cl. 83—238 **1 Claim**



1. In a conventional die cutting machine comprising:
1. a means for engaging a sheet of preformed articles,
2. an actuator arm,
3. a cam follower means,
4. a cam,
5. a pivoting means to cause said means for engaging to shift between predetermined positions when said actuator arm is moved under the influence of said cam,

the improvement which comprises:

a. a pneumatic cylinder,

b. a piston rod of said cylinder parallel to said actuator arm,

c. a plurality of yokes attached to a surface of said pneumatic cylinder so as to be parallel to and spaced radially apart from said piston rod and said yokes being provided with adjustable sized holes,

d. a yoke pin fixedly attached to said piston rod and extending radially therefrom so as to be contained within said adjustable sized holes, and

e. a means for moving the piston within said cylinder; wherein said pneumatic cylinder and said piston rod are part of said actuator arm so that motion of said piston rod with respect to said cylinder changes said length of said actuator arm.

4,005,627

ROTARY CUTTER DRUMS

Richard Adrian Craddy, Bristol, England, assignor to Masson Scott Thrissell Engineering Limited, Bristol, Great Britain

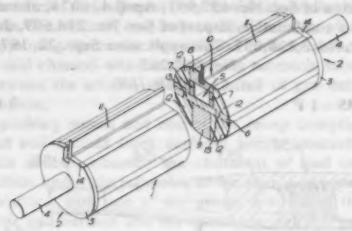
Filed Dec. 22, 1975, Ser. No. 643,269

Claims priority, application United Kingdom, Jan. 17, 1975, 2077/75

Int. Cl.² B26D *1/36*

U.S. Cl. 83—674 **6 Claims**

1. A rotary cutter drum for use in apparatus for cutting continuous web material into discrete lengths including a load carrying member, means for attachment of a cutter blade thereto, and non-load carrying light-weight material secured to said load carrying member and so arranged that the whole forms a body whose outer surface is rotationally symmetrical,



interrupted as necessary to allow for the presence of such cutter blade, in which means is provided on said load carrying member to balance said cutter blade and said attachment means.

4,005,628

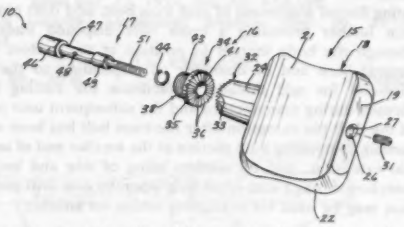
TUNING KEY FOR STRINGED INSTRUMENTS

Myron E. Darling, Webster City, Iowa, assignor to B.J.D. Industries, Minneapolis, Minn.

Filed Sept. 5, 1975, Ser. No. 610,544

Int. Cl.² G10D *3/14*

U.S. Cl. 84—304 **7 Claims**



1. A tuning key for stringed instruments having a peg box having an opening therein comprising:

an elongated spindle member rotatably received in said peg box opening;

a head piece connected to one end of said spindle member;

ratchet means for alternately engaging said head piece and disengaging therefrom to allow effective rotational motion of said head piece and said spindle member with respect to said peg box in one direction only when engaged, whereby the tautness of a string wound upon said spindle member is maintained, and to allow rotational motion in the opposite rotational direction when disengaged, whereby the tautness of the string is lessened, said ratchet means comprising:

means secured to said peg box for allowing longitudinal movement of said spindle member between a first and a second longitudinal position with respect to said peg box;

means in engagement with said spindle member for biasing said spindle member to said first position;

first tooth means rigidly attached to said peg box; and

second tooth means rigidly attached to said head piece for selectively engaging said first tooth means, said second tooth means being in engagement with said first tooth means in said first position and disengaged from said first tooth means in said second position.

4,005,629

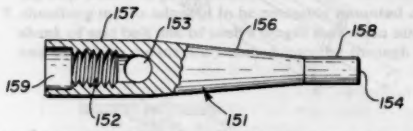
TRUSS BOLT DRIFT PIN

James W. Franklin, P.O. Box 3646, Albuquerque, N. Mex. 87110

Continuation of Ser. No. 457,957, April 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 214,699, Jan. 3, 1972, Pat. No. 3,826,057. This application Sept. 22, 1975, Ser. No. 615,265

Int. Cl.² F16B 1/00

U.S. Cl. 85—1 P 2 Claims



1. A truss bolt and drift pin combination for use in connection with the fabrication of truss systems comprising a truss bolt having a shank of length corresponding to the overall width of components to be joined, a head at one end of the shank, a shoulder at the opposite end of said shank, a threaded section on said bolt in position past said shoulder of size smaller than the size of said shank whereby the threads will not come into engagement with surfaces of the components to be joined, a drift pin extension for use with said truss bolt, a tapered exterior surface on said extension of size increasing gradually to a size corresponding to the size of said bolt shank, said drift pin extension at this larger end providing a mating surface for close engagement with the shoulder provided by said bolt shank and a longitudinally disposed central bore, and threads in said bore whereby the drift pin extension may be engaged to the threaded section of said bolt for the protection of said threads and to provide with said bolt a drift pin combination having a continuous transitional exterior surface facilitating forced placement of said truss bolt, said drift pin extension further providing a cross hole disposed transversely through the body thereof in position at the bottom of said central bore and of diameter corresponding to the minor diameter for said threads to facilitate the cutting of said threads during manufacture and the subsequent user removal of the drift pin extension after the truss bolt has been set, and further comprising a tip section at the smaller end of said drift pin extension, said tip section being of size and length for insertion through said cross hole whereby one drift pin extension may be used for wrenching action on another.

4,005,630

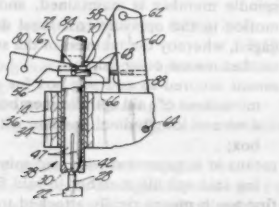
APPARATUS FOR SEPARATING A BULLET FROM A CARTRIDGE CASE

Dale M. Patrick, Wyandotte, Mich., assignor to Nathan A. Adler, Southfield, Mich., a part interest

Filed Feb. 25, 1975, Ser. No. 552,741

Int. Cl.² F42B 33/06

U.S. Cl. 86—1 A 8 Claims



1. An apparatus for separating a bullet from a cartridge case, said apparatus comprising a frame, hold-down means mounted on said frame, a reciprocating chuck comprising an inner and an outer sleeve concentrically and slidably disposed one within the other, said inner sleeve having an end forming engageable inner jaw surfaces over said bullet defined by at least a pair of end segments formed by diametrally opposed longitudinal slots extending all the way to the end of said inner sleeve, a tapered peripheral surface formed on said inner sleeve proximate said end and a tapered portion on the inner surface of said outer sleeve for engagement with said tapered peripheral surface for applying said gripping force to said jaw surfaces by urging said opposed segments toward each other, and lever means reciprocating said chuck, said lever means comprising a first lever having a floating fulcrum pivot on said frame and being pivotally attached to said outer sleeve for reciprocating said outer sleeve, a second lever pivotally attached to said inner sleeve and having a floating fulcrum on said first lever for reciprocating said outer sleeves relative to said first sleeve for applying said gripping force to said jaw surfaces and for subsequently reciprocating said inner and outer sleeves in unison away from said cartridge hold-down means.

4,005,631

DEVICE FOR SETTING MECHANICAL TIME FUSES

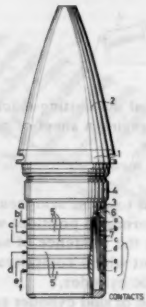
Hans Kaiser, Konigsfeld; Arthur Kopf, and Josef Müller, both of Schramberg, all of Germany, assignors to Gebruder Junghans GmbH, Schramberg, Germany

Filed Oct. 21, 1974, Ser. No. 516,417

Claims priority, application Germany, Oct. 23, 1973, 2352967

Int. Cl.² F42C 17/00

U.S. Cl. 89—6.5 7 Claims



1. In combination with an apparatus for adjusting a mechanical time fuse for a projectile in which a rotatable element is provided for adjusting the time period of the fuse; a housing forming a part of the projectile associated with the fuse, an electric motor in the housing coupled to the rotatable element to rotate the element, a setting device for the motor to rotate the motor to a predetermined rotated position to adjust the rotatable element thereby to set the fuse to a desired time period, said setting device being disposed outside the firing tube in which the projectile is disposed, and control wires leading from said setting device to said motor subject to including separable connector means therebetween.

4,005,632

LIQUID PROPELLANT GUN

John W. Holtrop, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 15, 1975, Ser. No. 613,690

Int. Cl.² F41F 1/04

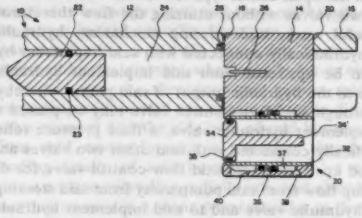
U.S. Cl. 89—7 4 Claims

1. In a gun,

a sliding breech block movable between a firing position and a loading position,

a firing device chambered in a first portion of said block,

valve means including a cylindrical valve slidably mounted in a second portion of said block and defining with said second block portion a fuel chamber and a hydraulic control chamber,



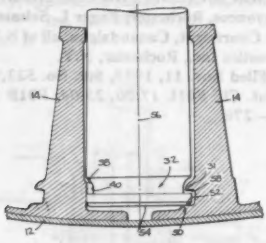
so that said valve means is removed from the breech area when the gun is in said firing position ready to be fired by said firing device.

4,005,633

STRUCTURE FOR ARTICLE HANDLING SYSTEMS

Robert G. Kirkpatrick, Shelburne, Vt., assignor to General Electric Company, Burlington, Vt.

Continuation of Ser. No. 414,205, Nov. 9, 1973, abandoned.
This application Mar. 21, 1975, Ser. No. 560,346
Int. Cl.² F41D *9/06*
U.S. Cl. 89—33 D **10 Claims**



1. An article handling system, for use in conjunction with a source of gravitational attraction, and with a plurality of substantially cylindrical articles, each article having a longitudinal axis, a transverse end surface perpendicular to the longitudinal axis, and an annular groove adjacent to and spaced from the transverse end surface and providing a transverse annular surface parallel to the transverse end surface, the transverse annular surface and the transverse end surface jointly defining an annular disk, including:

a pair of longitudinally extending, transversely spaced apart side walls, jointly defining a channel having a transverse width which is slightly greater than the diameter of one article, for receiving and freely passing therebetween a longitudinally extending column of side-by-side articles, each article standing on its transverse end surface disposed between said side walls and having a distal portion remote from the transverse end surface and projecting beyond said side walls;

pushing means for pushing the entire column of articles along said channel;

a first, longitudinally extending transverse track surface, facing toward said pushing means and adjacent one of said side walls and spaced from the other of said side walls, and defining the bottom of said channel, for solely abuting and supporting the transverse end surface of each article in said channel when the articles are substantially between said pushing means and the source of gravitational attraction;

a second, longitudinally extending transverse track surface, facing away from said pushing means, and disposed adjacent yet spaced from said first track surface by a distance slightly greater than the thickness of the annular disk of the article, and adjacent one of said side walls and spaced from the other of said side walls, for solely abuting and supporting the transverse annular surface of each article in said channel when said pushing means is substantially between the articles and the source of gravitational attraction;

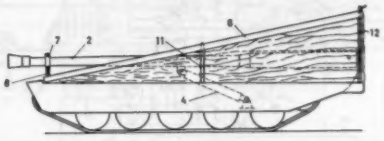
said pushing means and one of the group comprising said first and second track surfaces jointly interacting with each article, whereby the abutment of said one track surface under the influence of the source of gravitational attraction with one of the group comprising the transverse end surface and the transverse annular surface of each article while such article advances along said channel provides a frictional drag which is eccentric to the longitudinal axis of such article which causes each such article to rotate about its own longitudinal axis.

4,005,634

METHOD AND APPARATUS FOR RAISING A COLLAPSIBLE SCREEN MOUNTED ON A VEHICLE SUCH AS A TANK

Curt Olof Ekman, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Dec. 13, 1974, Ser. No. 532,580
Claims priority, application Sweden, Dec. 20, 1973, 7317183
Int. Cl.² F41H *5/00*
U.S. Cl. 89—36 H **5 Claims**



1. A method for selectively raising and lowering a collapsible screen which is normally stored in its collapsed state in a storage channel formed peripherally about the upper surface of a vehicle such as a tank or the like which vehicle pivotally supports therein a gun barrel, said method comprising the steps of:

a. operatively connecting to the non-pivoted end of the barrel one end of a rigid frame to which the screen is permanently secured along its upper edge while its lower edge is secured to the vehicle's peripheral surface,

b. raising said one end of said frame by elevating said barrel,

c. pivotally interconnecting said frame with the upper surface of the vehicle at the midsection of the opposed longitudinal sides of the frame,

d. lowering the barrel to thereby pivot said frame about its midsection pivotal supports to thereby raise the rear end of the frame,

e. pivotally supporting the rear end of the frame in its upwardly pivoted position,

f. pivoting said frame upwardly about its pivots at its rear end by again raising the barrel,

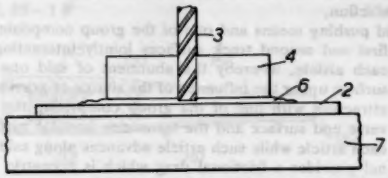
g. and supporting the forward end of the frame in its raised position.

4,005,635

METHODS AND EQUIPMENT FOR MACHINING ELECTRODES

Edward George Feldcamp, Tudor Cottage, Church End Twyning, Tewkesbury, Gloucestershire, England

Filed Nov. 4, 1974, Ser. No. 520,741
Int. Cl.² B23C 3/00
U.S. Cl. 90—11 C 3 Claims



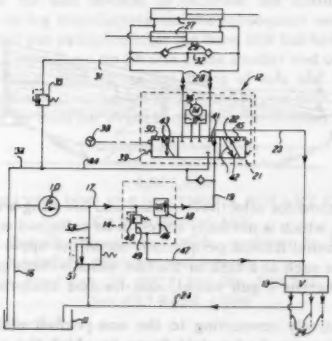
1. A method of manufacturing a spark erosion electrode, comprising
1. providing a rough-cut electrode blank,
2. soldering the blank to the upper surface of a base plate,
3. fixing the base plate to the table of a milling machine having a spindle with said surface at right angles to the axis of the spindle,
4. mounting a milling tool in said spindle,
5. milling the side edges of the blank throughout the full depth of the blank by means of said milling tool, and
6. removing the base plate from the table and detaching the milled blank from the base plate by fusing the solder.

4,005,636

HYDRAULIC SYSTEM FOR A WORKING MACHINE

Donnell L. Dunn, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed Feb. 13, 1975, Ser. No. 549,835
Int. Cl.² F15B 13/04
U.S. Cl. 91—31 1 Claim



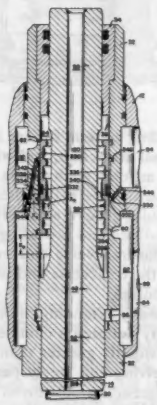
1. A hydraulic system for a working machine of a vehicle type having a hydraulically powered power steering mechanism and a hydraulically powered working implement, a hydraulic valve included in said steering mechanism, an additional hydraulic valve for operating said implement, the improvement comprising a flow control valve hydraulically connected with each of the other two said valves and being of the type and connected therewith for dividing hydraulic flow between said other two valves and to be free of any hydraulic pressure altering means and to be thus arranged to always have the same hydraulic pressure flow to said two valves, a hydraulic pump hydraulically connected with said flow control valve for pumping hydraulic fluid to all said valves, a hydraulic line connected directly between said other two valves to have said other two valves directly hydraulically connected together, said flow control valve being hydraulically connected with said other two valves to have said vehicle steering valve in a hydraulically parallel type of connection relative to the hydraulic connection between said flow control valve and said additional hydraulic valve, said other two valves being of the open-center type for the flow of fluid through said other two valves without utilizing the flow therethrough for any useful work, said steering mechanism hydraulic valve being hydraulically connected with said implement hydraulic valve to be upstream from said implement hydraulic valve relative to the hydraulic output of said pump, whereby all the flow through said flow control valve may be passed through said implement hydraulic valve, a fluid pressure relief valve hydraulically connected with said other two valves and being disposed upstream from said flow control valve for diverting the pump flow from said pump away from said steering mechanism hydraulic valve and to said implement hydraulic valve when hydraulic pressure at said steering mechanism hydraulic valve is at a minimum pressure, and an additional fluid pressure relief valve hydraulically connected with said pump and connected to by-pass said implement hydraulic valve for diverting flow from said pump away from said implement hydraulic valve when hydraulic pressure at said implement hydraulic valve is at a minimum pressure, and with said additional fluid pressure relief valve being arranged and of a type to divert the flow only at a hydraulic pressure greater than that at which the first said fluid pressure relief valve diverts the flow.

4,005,637

HYDROACOUSTIC APPARATUS AND VALVING MECHANISMS FOR USE THEREIN

John V. Bouyoucos, Rochester; Roger L. Selsam, Fairport, and Dennis R. Courtright, Canandaigua, all of N.Y., assignors to Hydroacoustics Inc., Rochester, N.Y.

Filed Nov. 11, 1974, Ser. No. 522,977
Int. Cl.² F01L 17/00, 25/04; F01B 7/18
U.S. Cl. 91—276 12 Claims



1. An impact tool for producing percussive forces for application to a load which comprises
a housing having a generally cylindrical opening therein,
a hammer mounted in said opening for oscillatory movement in opposite directions axially of said opening toward and away from an impact position, said hammer and said housing including a side wall defining in said opening an annular cavity,
a valve mechanism modulating the flow of hydraulic fluid into and out of said cavity for producing pressure variations therein for sustaining the oscillations of said hammer,
said valve mechanism including a valve element mounted in

said cavity for movement in opposite directions axially of said cavity,

pressurized hydraulic fluid supply and return means in said housing including supply and return ports into said cavity spaced from each other in a direction axially of said cavity and disposed in porting relationship with said valve element to alternately open and close said ports as said valve moves in said opposite directions,

said hammer having a radially extending portion which engages said valve element when said hammer moves in one of said opposite directions and moves said valve element therewith in said one of said opposite directions,

said valve element and the side wall of said housing which defines said cavity forming a chamber therebetween extending axially of said housing, said valve element having a portion extending radially into said chamber and presenting an area in a plane perpendicular to the axis of said housing,

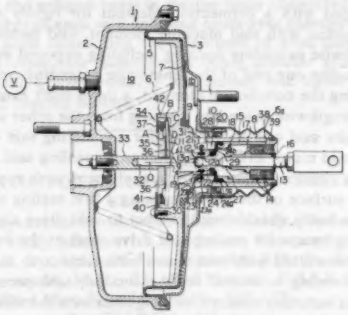
means communicating with at least one of said pressurized hydraulic fluid supply and return means for providing communication between said chamber and said supply and return means for applying hydraulic forces acting continuously in the other of said opposite directions upon said valve element to move said valve element continuously in the other of said opposite directions.

4,005,638

VACUUM-SUSPENDED TIRE SERVO-MOTOR

Hiroo Takeuchi, Ueda, Japan, assignor to Nisshin Kogyo Kabushiki Kaisha, Ueda, Japan

Filed Dec. 8, 1975, Ser. No. 638,689
Claims priority, application Japan, Feb. 18, 1975, 50-19473
Int. Cl.² F15B 9/10
U.S. Cl. 91—369 B **3 Claims**



1. A servo-motor of the vacuum-suspended type including:

a casing structure and a movable wall member dividing the casing structure into a front, first power chamber to which vacuum is always communicated and a rear, second power chamber;

an input member slidably fitted in said movable wall member;

an output member operatively connected with said movable wall member on the front side thereof; and

control valve means operatively connected with said input member and adapted to selectively place said second power chamber into communication with said first power chamber and the external atmosphere;

said control valve means comprising:

a tubular valve casing integral with said movable wall member on the rear side thereof and slidably supported by the rear wall of said casing structure, said valve casing having a front end wall constituting part of said movable wall member and opening at the rear end to the external atmosphere;

a first valve seat on said front end wall of said valve casing inside thereof in encircling relation to said input member;

a first annular valve member including an inner peripheral portion sealingly secured to said input member around the outer periphery thereof, an outer peripheral portion formed to serve as a valve closure element engageable with said first valve seat and an intermediate flexible web portion, said first valve seat and said first valve member cooperating with each other to define in said valve casing radially inner and outer spaces respectively communicating with said first and second power chambers;

a second valve seat on the rear end face of said input member;

a second valve member having an outer peripheral porting sealingly secured to said valve casing around the inner peripheral wall thereof, an inner peripheral portion adapted to serve as a valve closure element engageable with said second valve seat and an intermediate flexible web portion;

an annular reinforcement member provided with a radial through hole therein and interconnecting said valve closure elements of said first and second valve members integrally with each other to define therebetween an axial distance smaller than that between said first and second valve seats when said input member is in its rearmost position; and

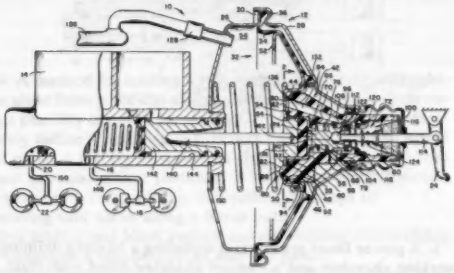
spring means associated with said first and second valve closure elements to bias the two elements toward said respective valve seats.

4,005,639

BACKING PLATE MEANS FOR A SERVOMOTOR

Harold H. Welsh, Jr., South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed June 6, 1975, Ser. No. 584,309
Int. Cl.² F15B 9/10
U.S. Cl. 91—376 R **10 Claims**



1. A servomotor for use in a vehicle, comprising:

a housing having a front shell and a rear shell, said front shell and said rear shell being joined together to form a sealed cavity therein;

diaphragm means having an external bead located between the front shell and the rear shell for establishing a front chamber and a rear chamber, said diaphragm means having an inner bead separated from an annular rib, said diaphragm means having a sleeve section which extends rearwardly from said annular rib, said diaphragm means having a series of holes located between said annular rib and said inner bead;

hub means having a first groove and a second groove, said first groove being associated with said annular rib and said second groove being associated with said inner bead, said hub means having an axial bore therethrough, said axial bore being connected to at least one of said series of holes in said diaphragm means through a passageway means;

backing plate means located adjacent said diaphragm means having a second series of holes therein aligned with said first series of holes in the diaphragm means, said

backing plate means having an inner surface which extends into said axial bore of the hub means, said hub means urging said sleeve section against said backing plate means to radially seal the rear chamber from the front chamber;

fastener means connecting said backing plate means to said hub means through some of said first and second series of holes for urging said annular rib and inner bead of diaphragm means into said first and second grooves, respectively, to sealingly separate the front chamber from the rear chamber; and

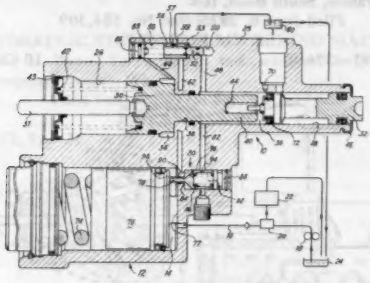
control means located in said axial bore of the hub means for allowing free communication between the front chamber and the rear chamber by way of communication through the axial bore through said passageway means, said control means responding to an input force to interrupt communication between the axial bore and the front chamber through said passageway means for allowing a source of fluid under pressure to enter the rear chamber and establish a pressure differential across the diaphragm means and backing plate means and create an output force which is directly transmitted through said inner surface of said backing plate means into an output means.

4,005,640

POWER BOOST MECHANISM

Alfred William Thomas, Saarbrucken, Germany, assignor to Deutsche Bendix Ausrustungs GmbH, Germany

Filed Nov. 7, 1975, Ser. No. 630,115
Int. Cl.² F15B *13/042*, *17/02*
U.S. Cl. 91—460 **6 Claims**



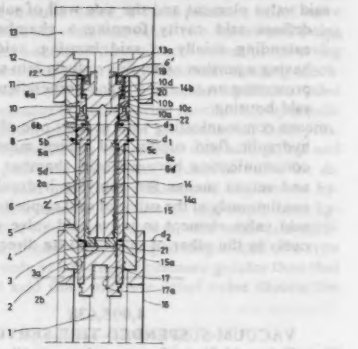
1. A power boost mechanism including a housing defining a working chamber and a control chamber filled with fluid, a fluid pressure accumulator having a pressure responsive element and a chamber filled with fluid for providing pressure fluid for operation of said power boost mechanism, control valve means responsive to the fluid pressure level in said control chamber to shift from a released position venting said working chamber to a position communicating pressure from the accumulator chamber into said working chamber as said control valve means is shifted from said released position, a piston slidably received within said working chamber, an output plunger operatively connected to said piston and slidably received within said control chamber, operator-actuated means including an input plunger slidably received within said control chamber, said control chamber communicating with said accumulator chamber by means of an exhaust passage including a spring biased relief valve allowing hydraulic fluid to flow from the accumulator chamber towards the control chamber when the pressure differential across said relief valve is above a first predetermined level, and said pressure responsive element responsive to the pressure level in the accumulator chamber being engageable with said relief valve to open the same when the pressure in the accumulator chamber is below a predetermined minimum level lower than said first predetermined level.

4,005,641

APPARATUS FOR ROTATING AND DISPLACING IN AXIAL DIRECTION A MACHINE ELEMENT

Thomas Nussbaumer, Zug, Switzerland, assignor to Patent & Inventions Ltd., Zug, Switzerland

Filed Dec. 23, 1974, Ser. No. 535,847
Claims priority, application France, Jan. 4, 1974, 74.00225
Int. Cl.² F01B *21/00*
U.S. Cl. 92—2 **4 Claims**



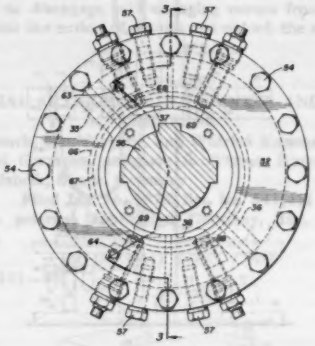
1. An apparatus for selectively moving a machine element mounted to be rotatable and axially displaceable, comprising a motor, a hollow cylinder, a piston displaceably arranged in said hollow cylinder, a machine element, said piston being provided with a connection element for rigidly connecting said piston with said machine element, said piston having a lengthwise extending opening including opposed ends, means for sealing one end of the lengthwise extending opening confronting the connection element, a drive shaft extending into said lengthwise extending opening from the other end thereof opposite said one end, means for connecting said drive shaft with said motor first sealing means for sealing said drive shaft at the region of the connection element with respect to an inner surface of the piston forming a first sealing section said piston being slidable with respect to said drive shaft, second sealing means for sealing said drive shaft at the region of its end connected with said motor with respect to said cylinder and forming a second sealing section, said second sealing means including means which together with the second sealing section form a tightly closing seat, said piston and said drive shaft possessing coupling means disposed between both of said sealing sections, said coupling means rigidly rotatably connecting the piston and the drive shaft with one another but permitting axial displacement relative to one another, means defining a first hydraulic connection for the infeed of a hydraulic agent for displacing said piston in one direction, said drive shaft possessing a throughpassage means which connects said first hydraulic connection with an end section of the lengthwise extending opening of the piston, said end section being located at the side of the connection element, a second hydraulic connection for the infeed of a hydraulic agent which opens into the hollow cylinder between the second sealing section and an end of a sliding surface of the piston which confronts said second sealing section for displacing the piston in said one direction, said first sealing section and said second sealing section possessing the same diameter, said first sealing section and said second sealing section constituting the sole sealing sections for preventing the hydraulic agent from impinging the drive shaft with axial forces during a working phase of the apparatus.

4,005,642

CROSS-OVER PORT CONSTRUCTION FOR HYDRAULIC MOTORS

Larry D. Hanawalt, Mansfield, Ohio, assignor to Shafer Valve Company, Mansfield, Ohio

Filed Aug. 6, 1975, Ser. No. 602,381
Int. Cl.² F01C 9/00
U.S. Cl. 92—122 **3 Claims**



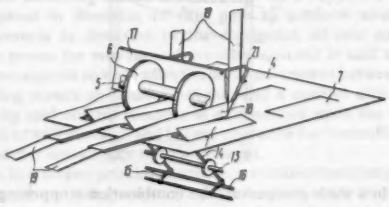
1. In a hydraulic motor having a rotor with diametrically opposite vanes for rotating between stationary shoes providing two pairs of fluid pressure chambers of varying volume on opposite sides of the vanes, conduits for supplying pressure fluid to one pair of said chambers and exhausting it from the other pair, a housing including a top plate enclosing said rotor, said top plate having a bearing bushing journaling said rotor; the improvement comprising two ports alternating as pressure fluid supply and exhaust ports in the top plate connected one to one chamber of each said pair, and cross-over passageways in said top plate connecting the chambers of each pair together, said cross-over passageways being annular grooves encircling said bearing bushing and having one open side abutting said bearing bushing.

4,005,643

APPARATUS FOR SECURING A BAND ON SHEET BLANKS

Myalik Khasyanovich Nurimanov, ulitsa Svobody, 89, korpus 1, kv. 19; Vitaly Afanasievich Kharlamov, Novopeschanaya ulitsa, 13/3, kv. 131, and Ivan Ivanovich Zabotin, Sevastopolsky prospekt, 34, kv. 22, all of Moscow, U.S.S.R.

Filed Mar. 5, 1975, Ser. No. 555,617
Int. Cl.² B31D 1/00
U.S. Cl. 93—1 R **3 Claims**



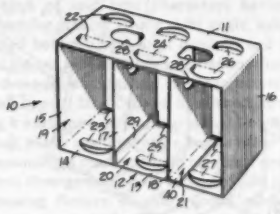
1. An apparatus for securing a band on sheet blanks for the formation of pockets for collection albums and the like, comprising: a framework; a system of vertically arranged pairs of driving rollers supported by said framework for positively advancing a succession of blanks therebetween; means for rotating said rollers; each of the first of said pairs of said rollers, in the direction of the advance of the blanks, being constituted as an arbor with a plurality of discs mounted on said arbor in spaced relationship; a plurality of spring-loaded rods supported adjacent the path of the blanks to bend away pre-punched flaps formed in said blanks, said rods being arranged parallel to one another in a row within respective spaces between said discs and under the advancing blanks; a plurality of guides for positive feed of respective bands, said guides being arranged parallel to one another in a row within said respective spaces between said discs above the advancing blanks, each said guide being in the form of a twisted plate having a vertical inlet portion and a horizontal outlet portion to turn a respective band from a vertical position into a horizontal position, said horizontal portion being positioned to introduce said band under the flap bent away by the respective one of said rods.

4,005,644

METHOD FOR MAKING A CAN CARRIER

George V. Tranquillitsky, 3161 Lynde St., Oakland, Calif. 94601

Division of Ser. No. 489,132, July 17, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,492
Int. Cl.² B31B 1/26
U.S. Cl. 93—37 SP **2 Claims**



1. A method for making a side loading carrier on a straight-line gluer from a pre-cut and scored one-piece blank comprising a plurality of parallel scorelines formed thereon to consecutively define a first flap, a first bottom panel portion, a first end panel, a top panel, a second end panel, a second bottom panel portion, a first partition, a bridging panel, a second partition and a second flap, comprising the steps of

moving said blank along a linear path,

first folding said blank and adhesively securing said bridging panel to a mid-portion of said top panel,

second folding said blank and adhesively securing said second flap to said first bottom panel portion, and

third folding said blank and adhesively securing said first flap to a side of said first partition directly.

4,005,645

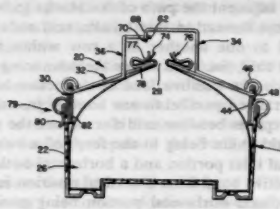
COOKING UTENSIL ACCESSORIES

Alexander Patton Janssen, 28 Old Farm Road, Bellair, Charlottesville, Va. 22903

Continuation-in-part of Ser. No. 327,658, Jan. 29, 1973, Pat. No. 3,946,654. This application Dec. 5, 1975, Ser. No. 637,966
Int. Cl.² A47J 27/10
U.S. Cl. 99—403 **37 Claims**

1. An attachment for use with a cooking vessel and a disposable bag to facilitate the cooking of comestibles in said bag, said attachment including a base; means for supporting the base from and fixing it relative to the cooking vessel; and a plurality of inwardly extending elements fixed to said base for concomitant pivotal movement relative thereto, there being bag engageable means at the inner ends of said elements to which the bag can be attached at an opening defining end

thereof, whereby said elements can be concomitantly rotated toward each other to constrict the opening during the cooking



of the comestibles and away from each other to enlarge the opening and furnish access to the comestibles in the bag.

4,005,646

ROTATABLE GRILL

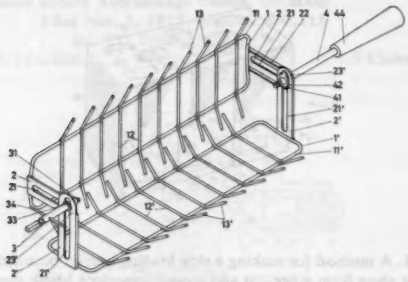
Burkhard Krüper, Menden, Germany, assignor to Firma Gebr. Cramer, Menden, Germany

Filed Sept. 2, 1975, Ser. No. 609,465

Claims priority, application Germany, Oct. 4, 1974, 7433343[U]

Int. Cl.² A47J *37/04*

U.S. Cl. 99—427 **9 Claims**



1. A rotatable grill for demountably retaining food objects comprising:

a first basket half;

a second basket half similar in size to said first basket half; and

pivotable bracket means for adjustably joining the ends of said basket halves to form a closed basket at their longitudinal sides, said baskets being pivotably moveable with respect to each other in the opened position.

4,005,647

STRAPPING MACHINE

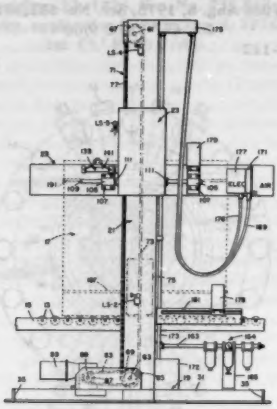
George F. Goodley, Media; William H. Woomer, Glen Riddle; Udaykumar B. Inamdar, Kennett Square, and Robert L. Gallagher, Aston, all of Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed Feb. 3, 1976, Ser. No. 654,814

Int. Cl.² B65B *13/04*

U.S. Cl. 100—4 **16 Claims**

1. A machine for applying a tensioned strap loop horizontally about the girth of an object including a mast, a ring extending laterally from said mast in substantially a horizontal plane and supported on said mast for movement longitudinally thereof between a retracted position and a projected position in which said ring encircles an object which is to be strapped, a sealing head mounted on said ring, means supporting said ring for traversing in its horizontal plane relative to said mast between a retracted position and a projected position in which said sealing head is located immediately adjacent to an object which is to be strapped, and a strap yoke mounted on said ring in the horizontal plane thereof and opening along the interior thereof, said yoke communicating with said sealing head and together there- with providing a generally continuous passage for lacing of strap along said ring as a loop having its leading



end overlying with a trailing portion thereof at said sealing head, said sealing head including means for tensioning a strap laced within said ring to provide a tensioned strap loop about an object which is to be strapped and means for securing together overlapping portions of the tensioned strap loop.

4,005,648

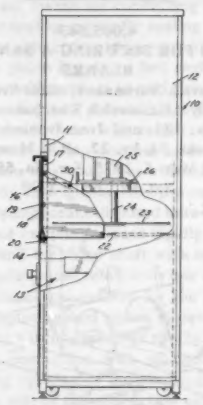
TRASH COMPACTOR

Earl S. Edwards, Windsor, Canada, assignor to McClain Industries Inc., Utica, Mich.

Filed Apr. 28, 1975, Ser. No. 572,110

Int. Cl.² B30B *15/00*

U.S. Cl. 100—53 **6 Claims**



6. In a trash compactor, the combination comprising

a body,

said body having a trash receiving area,

a pivotally mounted access door through which trash may be deposited to said trash receiving area,

and a vertically movable ram,

means for moving said ram from a position adjacent said access door to a compacting position in said trash receiving area,

and gravity operated lock means mounted on said body and

having engaging means normally urged by gravity in a direction to interengage said access door directly to lock said door,

said gravity operated lock means being operable by the ram upon downward movement of said ram to permit said engaging means to move downwardly by the action of gravity to engage said access door directly and lock said access door during the downward movement of the ram and operable by the ram upon upward movement of the ram to disengage said engaging means from said door against the action of gravity and unlock the access door.

4,005,649
SPECIAL ARTICLE SCREEN PRINTER AND DRIVE THEREFOR

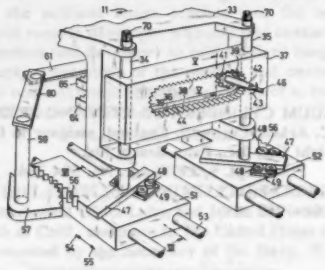
Karl Strauch, Kirchlengern, and Wilfried Kammann, Bunde, both of Germany, assignors to Werner Kammann Maschinenfabrik, Bunde, Germany

Filed Jan. 16, 1975, Ser. No. 541,411

Claims priority, application Germany, Jan. 22, 1974, 2402836

Int. Cl.² B41F *17/08, 15/08*

U.S. Cl. 101—40 **18 Claims**



1. In a screen-printing machine, a combination comprising at least one printing station past which an object to be printed travels in a path in a predetermined direction, and which includes a movable printing screen and a cooperating movable squeegee; a rack extending along said path; means for mounting said rack so as to be stationary in said direction of movement; means for rotating said object to be printed, including a gear meshing with said rack; means for moving said squeegee at a constant rate of speed; means for varying the speed of movement and the stroke of said printing screen in dependence upon the peripheral speed of the rotating object; mounting means for mounting said printing screen; mounting means for mounting said squeegee, including a carriage and a control member; a movable element connected between both of said mounting means and mounted on a support which is elongated in direction of said path to perform to-and-fro movements in direction of the elongation of said support; drive means for moving said movable element in said to-and-fro movements so as to effect relative movement between said printing screen and said squeegee; and a control slide operated by said control member in dependence upon the movements of said carriage and in turn operative for controlling the to-and-fro movements of said element.

16. In a screen-printing machine, a combination comprising at least one printing station past which an object to be printed travels in a path in a predetermined direction, and which includes a movable printing screen and a cooperating movable squeegee; a rack extending along said path; means for mounting said rack so as to be stationary in said direction of movement; means for rotating said object to be printed, including a gear meshing with said rack; means for moving said squeegee at a constant rate of speed; means for varying the speed of movement and the stroke of said printing screen in dependence upon the peripheral speed of the rotating object; and a discrete rack section located upstream of said rack with reference to the travel of the object in said path, said rack section being movable parallel to said rack between two end positions in one of which it contacts and forms a longitudinal extension of said rack.

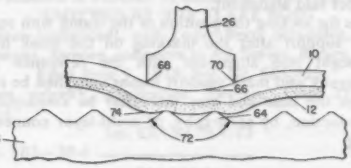
4,005,650
PRINT HAMMER

Donn F. Moore, Utica, Mich., assignor to Computer Peripherals, Inc., Rochester, Mich.

Continuation of Ser. No. 431,110, Jan. 7, 1974. This application July 16, 1975, Ser. No. 596,348

Int. Cl.² B41J *1/20, 9/02*; B41B *1/02*

U.S. Cl. 101—111 **4 Claims**



1. A print hammer for printing on record media in a printer having type characters movable along a path adjacent the hammer, each of said type characters having an included angle of chamfer greater than a right angle, said record media being located between said print hammer and said type characters, and means for actuating said hammer into contact with said record media and against said characters, said hammer including an impact face defined by spaced side edge portions and having a curvature of predetermined length from one side edge portion along said curvature to the other side edge portion and assuming a convex shape in which normals at neighboring points diverge in relation to one of said type characters, thereby causing flexure of said record media around said curvature upon impact of said face therewith and against said character, said angle of chamfer limiting the extent of flexure of said record media adjacent said character upon the impacting of said hammer against the record media.

4,005,651
APPARATUS FOR ORIENTING PATTERNS PROVIDED ON MASKS FOR SERIGRAPHY

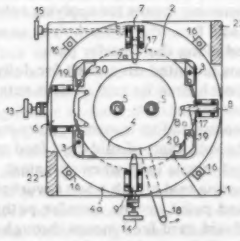
Pierre Louis Sigel, Villeneuve-le-Roi, and Karel Gaston Kurzweil, Eaubonne, both of France, assignors to Societe Honeywell Bull (Societe Anonyme), Paris, France

Continuation of Ser. No. 350,549, April 2, 1973, abandoned. This application Feb. 10, 1975, Ser. No. 548,215

Claims priority, application France, Apr. 25, 1972, 72.14643

Int. Cl.² B41F *15/36*

U.S. Cl. 101—127.1 **7 Claims**



1. An improved support for orienting a pattern provided on a mask with respect to the frame on which the mask is mounted with a reference pattern provided on a supporting

alignment base having at least two prongs mounted on the base and projecting from the base, the prongs each having a longitudinal central axis and being positioned so that their longitudinal central axes are a predetermined distance from said reference pattern and from each other comprising:

support means for mounting a mask, said mask having a pattern and a marking thereon, said support means including apertures to be selectively positioned on and removed from the prongs on the base and a frame to support said mask to the support in a fixed, predetermined position with respect to the base and with respect to the base reference pattern, said frame being selectively movable with respect to the support such that the marking on the mask may be brought into alignment with the reference pattern;

means for moving said frame with respect to the support to effect said alignment;

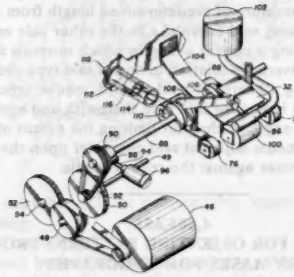
means for locking the position of the frame with respect to the support after the marking on the mask has been brought into alignment with the reference pattern, whereby said mask support means may then be removed from the base and may thereafter be employed in the production, by serigraphy, of multi-layer connector circuit.

4,005,652

ADDRESSING MACHINE AND VARIABLE DRAG DRIVE THEREFORE

Eduard C. Petry, Richfield, Minn., assignor to Speedaddress, Inc., Minneapolis, Minn.

Filed Feb. 10, 1975, Ser. No. 548,625
Int. Cl.² B41L 11/12
U.S. Cl. 101—131 1 Claim



1. A machine for duplicating printed matter from an imprint area of a master card to a selected area on one face of a workpiece comprising:

rotary drive means for imparting rotary motion to a first shaft;

transfer means driven by said first shaft, said transfer means accepting said workpiece upon which material is to be duplicated and transporting the workpiece continuously along a transfer path through the machine;

workpiece moistening means for applying solvent to at least a portion of said face of said workpiece as said workpiece is transported along the transfer path;

card feed means mounted on a shaft for delivering a single master card each time its said shaft is rotated through a complete revolution;

clutch means connected to transmit rotary motion from an input shaft to said shaft of said card feed means to drive said card feed means only when actuated;

means for actuating said clutch when a workpiece reaches a predetermined point on the transfer path, and rotating said shaft of said card feed means through one complete revolution to deliver said single master card with said imprint area in confronting aligned relationship with said moistened portion of said face of said workpiece as said workpiece is transported along the transfer path;

resilient coupling means connected to said first shaft and said input shaft of said clutch means for providing a resilient coupling between said first shaft and said input shaft of said clutch means whereby the rotary motion of said input shaft of said clutch means is permitted to lag the rotary motion of said first shaft;

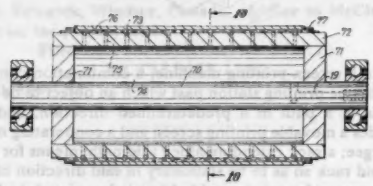
adjustable drag means comprising a piston mounted in a cylinder having a variable aperture orifice therein to control the amount of drag, said drag means connected to said card feed means to adjustably inhibit motion thereof, said adjustable drag means and said resilient coupling means cooperating to adjustably inhibit rotational movement of said shaft of said card feed means relative to said first shaft to cause said card feed means to provide an adjustable time lag in the delivery of said master card from said card feed means relative to the transporting of said workpiece through the machine thereby altering the location of the area on said workpiece where the printed matter is to be duplicated.

4,005,653

VACUUM CYLINDER FOR PRINTING PRESSES

William C. Arkell, Cornwall, England, assignor to Livermore and Knight Co., Inc., Palm Beach, Fla.

Filed Sept. 9, 1974, Ser. No. 504,254
Int. Cl.² B41F 27/06, 27/12
U.S. Cl. 101—382 MV 6 Claims



1. A vacuum-operated printing cylinder, which comprises

a. a shaft,

b. a cylinder sleeve supported on said shaft and defining a vacuum chamber,

c. a plurality of closely spaced, generally continuous annular grooves formed on the outer surface of said cylinder sleeve,

d. air passage means connecting each of said annular grooves with said vacuum chamber,

e. said cylinder sleeve having at least one axially disposed groove intersecting said annular grooves,

f. axially disposed sealing strip means tightly received in and completely filling said axial groove, whereby said sealing strip means forms a continuation of the outer surface of the sleeve in the circumferential direction and blocks said annular grooves to provide a predetermined circumferential discontinuity between adjacent ends of each annular groove, and

g. a printing plate mounted on the outer surface of said sleeve whereby said printing plate is held on said cylinder by the vacuum power of said chamber without the aid of mechanical clamping means,

h. said printing plate being arranged so that the end edge portions thereof overlap said sealing strip means thereby avoiding leakage adjacent to the ends of the vacuum-held printing plate.

4,005,654

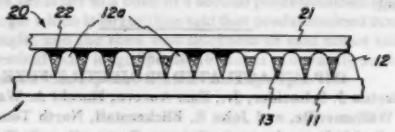
PROCESS FOR SHALLOW RELIEF PRINTING

Robert W. Gundlach, Victor, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 207,846, Dec. 14, 1971, abandoned. This application Dec. 23, 1975, Ser. No. 643,716

Int. Cl.² B41M 1/02; B41N 1/12; B41F 31/22

U.S. Cl. 101—426 6 Claims



1. A printing process comprising forming a resilient image having a relief of from about 4 microns to about 50 microns on a hard, non-resilient surface forming a background for the image, providing a gravure donor member, providing a liquid developer recessed within the cells of said gravure donor member from about 4 microns to about 50 microns below the surface of the contact plane, contacting both image and non-image areas of the master with the gravure donor member whereby the resilient image reaches into the recesses to contact and remove developer whereby said contacting selectively transfers said developer to said resilient image and not to the background areas of the master, and contacting said developer resilient image with a receiver sheet to transfer said developed image to said receiver sheet.

4,005,655

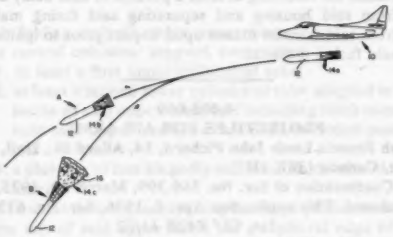
INFLATABLE STABILIZER/RETARDER

Nick Kleinschmidt, China Lake, and James V. Netzer, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 2, 1976, Ser. No. 654,315

Int. Cl.² F42B 25/02

U.S. Cl. 102—4 11 Claims



1. A tail assembly for a fin stabilized retarded bomb comprising:

an adapter ring configured to permit attachment to the aft end of a bomb;

a plurality of fin members each having one end pivotally attached to said adapter ring;

said fin members comprising a structural member of T-shaped cross section with the fin portion attached to a base cross member or web portion extending orthogonal to said fin portion;

said fin members forming together a cylindrical enclosure area;

an inflatable bag positioned within said cylindrical enclosure area and being fastened to said web portions;

said inflatable bag having first and second ram air openings designed to admit air to the inside of said bag when the bomb is released from an aircraft;

means for confining said fin members at the aft end thereof so that the fin portions of said members are substantially confined within the envelope diameter of the bomb;

means for confining said bag from opening further than a predetermined amount;

means for removing the restraint of said confining means and allowing full inflation of said bag.

4,005,656

DEVICE FOR A PYROTECHNICAL FLARE BODY COMPRISING A FLAME SPREADER FOR THE FLAME EMITTED BY THE FLARE BODY

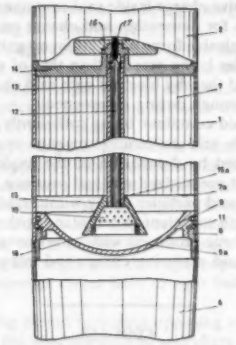
Nils Göran Gellerstedt, and Yngve Bertil Stradälen, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed June 9, 1975, Ser. No. 585,425

Claims priority, application Sweden, June 27, 1974, 7408464

Int. Cl.² F42B 4/12

U.S. Cl. 102—35.6 8 Claims



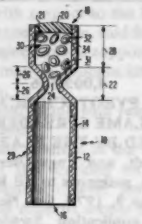
1. In a pyrotechnical device of the type comprising a cylindrical container having an elongated cylindrical flare body therein, one end of said container being open to emit an outwardly directed flame from said container upon ignition of an ignitable end surface of said flare body that is disposed adjacent to the open end of said container, the improvement comprising an elongated support element embedded within said flare body at a central location therein and extending along the central axis of said cylindrical container and flare body completely through said flare body in the direction of elongation of said body, and a flame spreader attached to one end of said support element at a position adjacent to said ignitable end surface of said flare body, said flame spreader having at least one flame deflection surface disposed at a central location relative to said ignitable end surface for controlling the emission of said outwardly directed flame from said end surface in the region between said flame deflection surface and the sides of said continer, the side walls of said container adjacent the pen end of said container extending beyond said ignitable surface of said flare body and beyond at least a major portion of said flame deflection surface, said flame spreader being shaped substantially as a truncated cone coaxial with said support element and being positioned with the smaller end of said truncated cone located adjacent to said ignitable surface of said flare body, the outer conical surface of said truncated cone acting as said flame deflection surface, said outer conical surface being freely spaced from the cylindrical side walls of said container that extend beyond said ignitable surface of said flare body to permit said outwardly directed flame to pass freely therebetween.

4,005,657

PYROTECHNIC NOISEMAKER

Barry Rothman, deceased, late of Downingtown, Pa. (Shirley Rothman, administratrix), assignor to Merton C. Jacobs, Philadelphia, Pa., a part interest

Filed Apr. 7, 1975, Ser. No. 565,752
Int. Cl.² F42B 4/16
U.S. Cl. 102—37 **16 Claims**



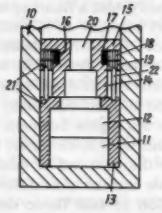
1. A noisemaking device comprising:
a thin-walled container having a constricted passage to pass explosive gas out of said container;
a small explosive charge inside said container and a plurality of particles for detonating said charge on impact to produce an explosive force of a certain magnitude, the size of said particles being greater than that of said constricted passage and thereby blocked with said charge from passing therethrough during quiescence,
the wall of said container being sufficiently thin to expand substantially said constricted passage under pressure of gas produced by detonation of the explosive charge to release said pressurized gas and produce a desired noise and retain said particles safely within said container, and
having strength sufficient to withstand without rupture said explosive force produced within the container upon detonation of said explosive charge and release of said pressurized gas.

4,005,658

SAFETY DEVICE FOR A CURRENT GENERATOR USED WITH AN ELECTRICAL PROJECTILE FUZE

Panayotis Karayannis, Zurich, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Nov. 20, 1975, Ser. No. 633,925
Claims priority, application Switzerland, Dec. 13, 1974, 16589/74
Int. Cl.² F42B 15/00, 19/34; F42C 11/04, 13/00
U.S. Cl. 102—70.2 G **4 Claims**



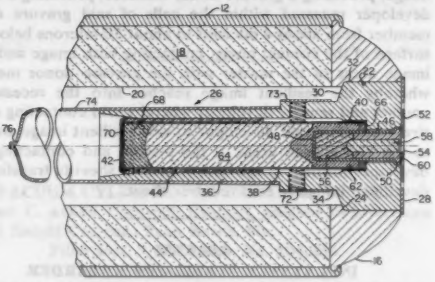
1. A safety device for a current generator of an electrical projectile fuze having a lengthwise axis for a projectile, comprising a housing member, a permanent magnet component, an induction coil component and a soft iron core component arranged in said housing member, two of said components being mounted to be relatively movable with respect to one another, means for preventing unintentional movement of the movable component, said movement preventing means comprising rods structured for buckling, a member fixed to the housing member, each of the rods having opposed ends and secured at one end to the housing-fixed member and at their other end at the movable component and permitting displacement of the movable component only after overcoming the buckling resistance of the rods, said rods being arranged along a cylinder surface extending about the lengthwise axis of the projectile fuze and in spaced relationship therefrom, said rods being subjected to compressive load in the axial direction by both said housing-fixed member and said movable component.

4,005,659

IMPACT ACTUATED PROJECTILE FUZE

Clayton J. Schneider, Jr., East Aurora; Harold A. Washburn, Williamsville, and John E. Blickenstaff, North Tonawanda, all of N.Y., assignors to Calspan Corporation, Buffalo, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,136
Int. Cl.² F42C 1/12
U.S. Cl. 102—72 **16 Claims**



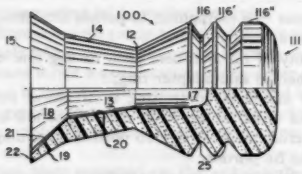
13. A projectile fuze, comprising;
a. a fuze housing,
b. a delay casing releasably fixed to said housing,
c. a body of ignitable fusing material located in said casing,
d. heat transfer means secured to said housing for transferring heat to said fusing material, and
e. means for releasing at least a portion of said delay casing from said housing and separating said fusing material from said transfer means upon impact prior to ignition of said fusing material.

4,005,660

PROJECTILES FOR AIR ARMS

Joseph Francis Louis John Pichard, 14, Allard St., Hull, Quebec, Canada (J8X 1H2)

Continuation of Ser. No. 560,399, March 20, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 672,978
Int. Cl.² F42B 11/02
U.S. Cl. 102—92.1 **10 Claims**



5. In a projectile for an air arm wherein the projectile form is a body of revolution about a longitudinal axis comprising a head portion dimensioned for free sliding fit in the bore of the air arm and an after portion of frusto-conical form having its rearward end dimensioned to be an interference fit in the said bore and having its forward end of reduced diameter joined

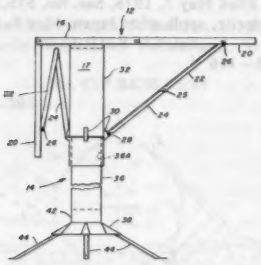
with the head portion, the frustum being shell-walled and having a coaxial recess enlarging toward said rearward end and extending axially forwardly into said head portion, the improvement wherein: a major forward axial length portion of said after portion is conformed generally to a cone of a first predetermined apical angle, and wherein the outer surface of a minor rearward terminal axial length portion of said after portion flares outwardly rearwardly from a junction with the said major forward length portion and said outer surface conforms generally to a cone of a second predetermined acute apical angle which is larger than said first predetermined acute apical angle, and the shell wall thickness of said minor rearward terminal axial length portion reduces rearwardly so that the projectile has a pliant annular trailing edge.

4,005,661

FOLDING UMBRELLA TABLE

Dewey Mason, 6428 S. 42nd W. Ave., Tulsa, Okla. 74107, and Riley C. Mason, Rte. 2, Box 25, Hulbert, Okla. 74441

Filed Jan. 14, 1975, Ser. No. 540,826
Int. Cl.² A47F 3/00
U.S. Cl. 108—128 **6 Claims**



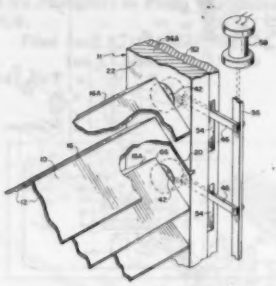
1. A folding umbrella table, comprising:
a. a central columnar support, comprising:
1. at least a first upper cylindrical tube;
2. at least a second lower cylindrical tube adapted to slide inside of said upper tube, and including latch means to hold said upper and lower tubes in extended position; and
3. a plurality of feet hingedly mounted inside of said lower tube;
b. a circular table top comprising a central plate attached to the top of said upper tube, the peripheral edge of said plate having a plurality of radial slots spaced equally around the circumference;
c. a plurality of radial arms equal in number to said radial slots formed of angle material having a triangular shaped horizontal web, and means for hinging each of said arms by their vertical webs, one in each of said radial slots;
whereby when said arms arms are in a radial position their triangular webs contiguously fit to form the annular outer portion of said table top;
d. a second plurality of radial support arms, forming a selected fraction of said radial arms and having wide vertical webs equally angularly spaced, serving as support arms, and including means including hinged bracket means for supporting said support arms near their outer ends in a horizontal plane;
e. hinged beam means attached as by hinges in the space between each pair of radial support arms near their ends;
f. the remainder of said radial arms having narrow vertical webs, resting on said hinged beam means.

4,005,662

ARMOR WINDOW

Robert A. Kohn, and Karen Kohn, both of 3902 E. Weldon Ave., Phoenix, Ariz. 85018

Filed Mar. 21, 1975, Ser. No. 560,791
Int. Cl.² E05G 7/00
U.S. Cl. 109—16 **4 Claims**



1. An armor window comprising:
a frame including symmetrically opposing side members and opposing end members;
a plurality of angle irons each having two depending flanges disposed at right angles to each other and joined along proximate upper edges to form an apex, said angle irons defining optically flat mirror surfaces on the outer and inner sides of both flanges;
means for supporting said angle irons at their opposite ends upon said opposing side members with said flanges and apexes spaced from each other for movement of air and sound between them and said apexes being disposed on a center line and spaced a distance less than approximately one-half the width of one of said flanges for continuous overlapping of flanges with their apexes parallel with each other to interrupt direct lines of sight between the angle irons;
said supporting means including opposing support journals secured to the opposite ends of said alternate angle irons;
bearing means for journalling said opposing support journals in said opposing side members for pivotally supporting the alternate angle irons upon axes disposed in close proximity to the apexes of said angle irons;
means for rotating said journal means including radially extending elements on said journal means; and
manually controlled means for actuating said extending elements in unison.

4,005,663

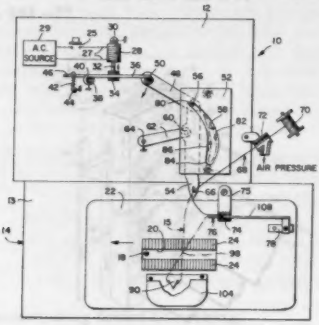
BELT LOOP FORMING ATTACHMENT FOR SEWING MACHINE

Raymond Barthelmes, P.O. Box 602, Wurtsboro, N.Y. 12790

Filed Dec. 18, 1975, Ser. No. 641,913
Int. Cl.² D05B 3/00
U.S. Cl. 112—115 **4 Claims**

1. In sewing machine apparatus having a generally vertically reciprocable sewing needle positioned above an elongated throat in a sliding generally horizontal portion of a bed of the sewing machine apparatus, said sliding portion adapted to carry a garment in an elongated sewing path by said needle, the attachment for forming a generally horizontal thread loop on the bed of the sewing machine apparatus, said thread loop intersecting said throat to enable the needle of the sewing machine apparatus to sew the loop on a garment positioned over the thread loop, said attachment adapted to cooperate with a source of thread for said loop, said attachment comprising: a prong mounted on the sliding portion of the bed of the sewing machine on one side of said throat; a linkage mounted

proximate the bed of the sewing machine apparatus on the other side of said throat, said linkage including a horizontally moveable arm having an eye at one end nearest the throat adapted to receive thread from said source therethrough; means on said other side of said throat for holding a free end of said thread after passage through said eye; said eye having



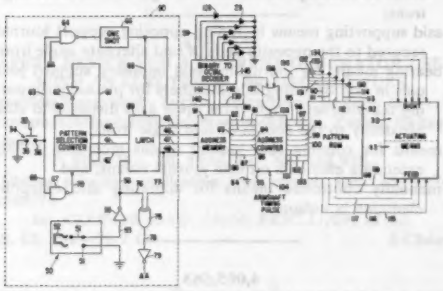
an initial position on said other side of said throat, said linkage being actuatable for moving said eye across said throat, around a side of the prong facing away from the throat, and then returning across the throat to its initial position for forming said thread loop supported at its point greatest curvature on said prong, and motor means for actuating said linkage.

4,005,664

SEWING MACHINE PATTERN SELECTION SYSTEM

Stephen Alexander Garron, Elizabeth, N.J., assignor to The Singer Company, New York, N.Y.

Filed Sept. 17, 1975, Ser. No. 614,288
Int. Cl.² D05B *3/02*
U.S. Cl. 112—158 E **9 Claims**



1. A multiple pattern sewing machine having instrumentalities for forming a succession of stitches individually placed in a selected one of a plurality of different patterns, said sewing machine including a static pattern memory means in which a multiplicity of separate digitally coded words are stored in a predetermined sequence with each word corresponding to one individually placed stitch in a pattern, an address memory means in which separate signals are stored in a numerical sequence each addressing the starting code word address in said static pattern memory means for a different one of said plurality of patterns, means for providing timing pulses related to the formation of successive stitches by said sewing machine, means utilizing said timing pulses for addressing digital code words in said static pattern memory means in said predetermined sequence beginning with said starting word identified by an address memory signal, means effective automatically to return to said starting word identified by said address memory signals to repeat said predetermined sequence, and actuating means responsive to said predetermined sequence of digitially coded words and operatively connected to said stitch forming instrumentalities for influencing said stitch forming instrumentalities to form a selected pattern in response thereto, the improvement which comprises a pattern selection means rendered effective by manipulation of a single operator influenced pattern selector switch means for selecting any one of said pluralities of different patterns, said pattern selection means comprising:

a. a pattern selector switch means accessible to a sewing machine operator on said sewing machine,

b. a pattern selection counter arranged to deliver as an output to said address memory means a predetermined numerical sequence including at least a portion of that in which said separate signals are stored in said address memory, and

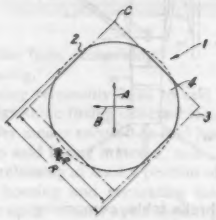
c. means effective in response to actuation of said pattern selector switch means for indexing said pattern selection counter through said predetermined numerical sequence.

4,005,665

METHOD FOR MAKING PRESS-WORKING BLANKS WITH REDUCED EAR OCCURRENCE

Toshiro Nishihara; Nobuyuki Takahashi; Hiroshi Katoh, and Touru Ishimaru, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,262
Claims priority, application Japan, May 8, 1974, 49-51430
Int. Cl.² B21D *53/00*
U.S. Cl. 113—116 V **2 Claims**



1. A method for preparing a steel blank which comprises cutting a cold rolled steel sheet in a planar shape obtained by overlapping a circle having a diameter R and a square having a side length of about 13/14 with their center points being at the same point and by cutting unoverlapped portions.

4,005,666

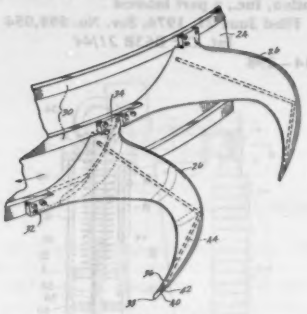
FLUID VACUUM RELEASE FOR ICE CUTTING SYSTEMS

Joseph F. Schirtzinger, Pasadena, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Continuation of Ser. No. 458,905, April 8, 1974, abandoned.
This application June 23, 1975, Ser. No. 589,411
Int. Cl.² B63B *35/12*
U.S. Cl. 114—42 **5 Claims**

1. A comminuting ice cutter comprising a plurality of rotating cutter elements, the cutter elements having a plurality of cutting edges spaced circumferentially around a common axis and adapted to engage ice and dislodge pieces of ice by impacting action, drive means rotating the cutter elements continuously in a direction around said common axis for applying high velocity impacts on the adjacent ice, and means for directing fluid under pressure at the interface between each of the cutting edges of the cutter elements and the ice when it comes in contact with the cutting edges, said fluid means by

fluid ejection dissipating the partial vacuum resulting from ice cleavage and changing it into a positive pressure which aids



the separation and removal of the chips by the cutter elements.

4,005,667

WATERCRAFT WITH HYDROFOILS

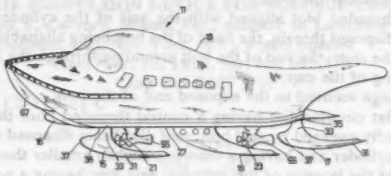
Tomo Staba, Kleine Reichenstrasse 24, 2 Hamburg 11, Germany

Filed Mar. 25, 1975, Ser. No. 561,876

Claims priority, application Switzerland, Mar. 25, 1974, 4152/74

Int. Cl.² B63B *35/44*

U.S. Cl. 114—283 **12 Claims**



1. A watercraft, comprising: only a single one-piece hull having a longitudinal axis of symmetry and opposite sides; at least two pairs of adjustable hydrofoils having lifting surfaces and being respectively mounted beneath and on opposite sides of said hull; a plurality of propellers respectively arranged adjacent at least one pair of said hydrofoils; means for swivelling said propellers about respective generally vertical axes for changing the travelling direction of said watercraft; said hull having two side keels arranged in lateral spaced relationship with respect to each other and each extending substantially the entire longitudinal length of the watercraft, and a bottom shaped concavely in an upward direction and extending between said two keels; said bottom lying below the normal water level when the watercraft is at rest; means including said propellers said concave bottom and said hydrofoils for lifting said watercraft upwardly and lifting said bottom above the water level during driving of the watercraft by said propellers; means for pivotally mounting one pair of hydrofoils on one keel so as to have front and rear hydrofoils on the one keel, and the other pair of hydrofoils on the other keel so as to have front and rear hydrofoils on the other keel; each of said hydrofoils having a portion extending downwardly from its keel at an angle with respect to the longitudinal vertical plane of symmetry of said hull and a curved lifting surface portion curving outwardly from said downwardly extending portion so that in each position of the boat and hydrofoil the lifting surface extends generally horizontally and approximately at right angles to the longitudinal plane of symmetry with an angle of attack relative to the surface of the water; and said means for mounting the hydrofoils also adjusting the angle of attack of the lifting surfaces relative to the surface of the water.

4,005,668

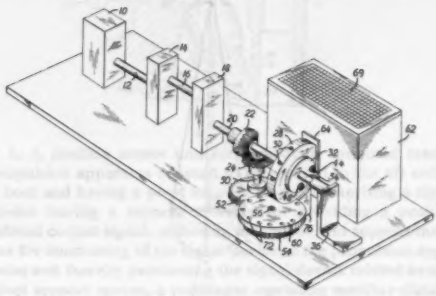
MATERIAL TRANSFER METHOD AND APPARATUS

James M. Washington, Richmond, and Emil A. Marx, Chester, both of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed June 9, 1975, Ser. No. 585,105

Int. Cl.² B65B *1/16, 3/10*

U.S. Cl. 141—67 **10 Claims**



1. Apparatus for use in making cigarette filters containing granular material comprising:

a. hopper means for containing said material;

b. a material collector wheel supported for rotation about a first axis and having a slot with a first end open at the circumference of said collector wheel and an opposite end, said collector wheel supporting an air permeable member in said slot thereof;

c. a receptor wheel supported for rotation about a second axis perpendicular to said first axis and having a slot with an end open at a side surface of said receptor wheel, said receptor wheel supporting in said slot thereof a filter assembly defining a cavity having an opening facing said side surface;

d. drive means for rotating said collector wheel about said first axis to move said collector wheel slot first end interiorly of said hopper means and then exteriorly thereof to a registration position and for rotating said receptor wheel about said second axis to move said receptor wheel slot end into facing relation with said collector wheel slot first end at said registration position; and

e. air pressurization means for negatively pressurizing said collector wheel slot opposite end selectively upon disposition of said collector wheel slot first end interiorly of said hopper means, whereby material is transferred into the extent of said collector wheel slot extending outwardly of said air permeable member thereof, and for providing selective differential pressurization axially of said collector wheel and receptor wheel slots at said registration position, thereby discharging said material from said collector wheel slot into said filter assembly cavity

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4,005,669

MAST DISPLACEMENT MECHANISM

Julius Roland Klemm, 408 NE. 28 Road, Boca Raton, Fla. 33432

Filed Apr. 28, 1975, Ser. No. 572,123

Int. Cl.² B63B *15/00*

U.S. Cl. 114—91 **3 Claims**

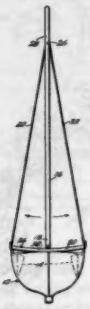
1. A mast displacement mechanism for a vessel having a hull and an upstanding mast with a lower end, said mechanism comprising:

a cradle supported by the hull and defining arcuate track means of a radius of curvature of a first predetermined finite length,

a carriage movable with respect to said track means and limit means to limit movement of said carriage,

means on the carriage to connect to the mast at about the hull level for movement of said lower end together with the carriage relative to the track;

lock means to lock the carriage in selected positions with respect to said track means for tilting the mast;



said carriage comprising a forward pair and a rearward pair of wheels captivated by said track means;

operator means effective to tilt the mast when said lock means is not restraining movement of the lower end of the mast; and

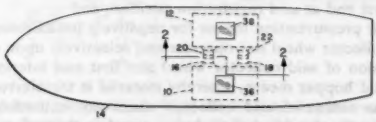
said operator means comprising a plurality of teeth comprising a rack in said track means and a gear on said carriage in engagement with said rack including an operator shaft extending outwardly of said track and in engagement with said gear so that upon rotation of the gear the carriage will move with respect to said track means.

4,005,670

PASSIVE STABILIZATION SYSTEM FOR SHIPS

John Zaninovich, Chula Vista, and Ante Stipich, San Diego, both of Calif., assignors to Campbell Industries, San Diego, Calif.

Filed Feb. 1, 1971, Ser. No. 111,207
Int. Cl.² B63B *43/06*
U.S. Cl. 114—125 **8 Claims**



1. A stabilization system for a ship comprising:

at least two tanks means for the storage of liquid,

cross over means comprising an enclosed duct means connecting said tank means below the tops thereof, for transferring water between said tank means during rolling of said ship,

said tank means being located on either side of the fore and aft center line of said ship,

said tank means being spaced from one another by a distance less than the beam-wise width of a single one of said tank means,

said cross over means is effective for permitting only a portion of said liquid to move from one tank means to another during rolling of said ship, and

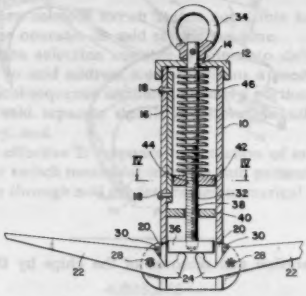
said enclosed duct means is spaced from the bottom of said tank means.

4,005,671

ADJUSTABLE STRENGTH ANCHOR

Leo D. Ogle, Longview, Tex., assignor to The Raymond Lee Organization, Inc., a part interest

Filed June 21, 1976, Ser. No. 698,054
Int. Cl.² B63B *21/44*
U.S. Cl. 114—298 **4 Claims**



1. An anchor comprising:

a hollow elongated cylinder having a cap with a central opening at one end and open at the other end, said cylinder having a plurality of equidistantly spaced like slots in the wall which extend for a short distance in the axial direction from the other end toward the cap;

an elongated bar parallel to the axis of the cylinder and secured to the inner wall of the cylinder, one end of the bar being adjacent the cap, the other end of the bar being adjacent the slots;

a threaded blot aligned with the axis of the cylinder and disposed therein, the head of the bolt being alignable with the slots, the end of the bolt extending through the opening of the cap;

an eye secured to the exposed end of the bolt;

a flat circular disc having a central threaded bore threadedly engaged by said bolt, said disc being disposed in the cylinder and having a diameter slightly smaller than that of the interior of the cylinder, said disc having a portion cut away whereby the disc bears against the bar slidably but non-rotatably;

a coil spring disposed concentrically about the bolt inside the cylinder, one end of the spring bearing against the cap, the other end of the spring bearing against the disc;

a plurality of like elongated arms, each arm extending through a corresponding slot, one end of each arm being disposed within the cylinder and engagable by said bolt head, a major portion of each arm extending outside of the cylinder; and

a like plurality of means disposed outside the cylinder, each means being aligned with a corresponding slot and pivotally securing each arm to said cylinder at a point intermediate its ends but adjacent said one end of the arm.

4,005,672

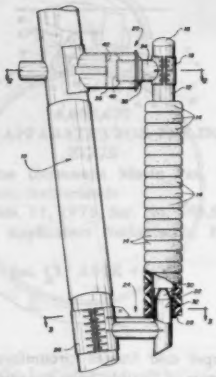
BUMPER WITH CUSHION PIVOT AT BOTTOM

James Harold Files, New Orleans, La., assignor to Regal Tool & Rubber Co. Inc., Corsicana, Tex.

Filed Apr. 15, 1976, Ser. No. 677,447
Int. Cl.² B63B *59/02*; E02B *3/22*
U.S. Cl. 114—219 **8 Claims**

1. In a bumper assembly where a vertical main cylinder is secured at the upper end to a marine structure by a releasable connection, the combination comprising:

a. a lower support for said main cylinder including an upstanding stab post extending into the bottom of said main cylinder in coaxial alignment with said upper end; and



b. a resilient cylinder between said main cylinder and said stab post.

4,005,673

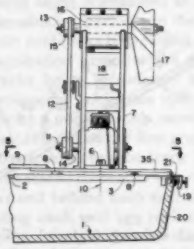
AIR PROPULSION DEVICE FOR SURFACE CRAFT

Alfred V. Carrero, Miami, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 10, 1976, Ser. No. 665,578

Int. Cl.² B60F *3/00*

U.S. Cl. 115—1 C **8 Claims**



1. An air propulsion device for surface craft comprising a lateral craft engaging platform having gunwale engaging means to removably engage opposing outboard gunwale sides of a craft and bulkhead engaging means to removably engage a bulkhead athwart said gunwales at a point astern of said gunwale engaging means, a pivot point having a pivot axis normal to said lateral craft engaging platform located substantially centered between said gunwales and forward of said bulkhead, a lateral propulsion device mounting platform pivotably secured to said lateral craft engaging platform normal to said pivot axis, means to rotate said lateral propulsion device mounting platform about said pivot axis, engine means adapted to mount to said lateral propulsion device mounting platform, said engine means rotatably adapted to drive a horizontal shaft whose longitudinal axis is substantially parallel to said lateral propulsion device mounting platform and having an air propulsion blade extending radially outwardly therefrom.

4,005,674

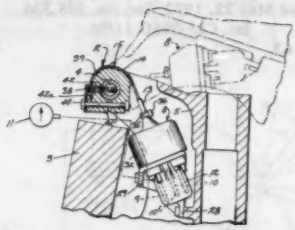
PIVOT POSITION SENSING APPARATUS

James Arthur Davis, Ripon, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Sept. 4, 1975, Ser. No. 610,416

Int. Cl.² B63H *5/12*

U.S. Cl. 115—41 R **15 Claims**



1. A position sensor unit for a pivotally mounted marine propulsion apparatus adapted to be secured to the aft end of a boat and having a pivot support means, comprising a signal device having a support member for providing a position related output signal, mounting means for said support member for connecting of the signal device to the propulsion apparatus and thereby positioning the signal device related to said pivot support means, a rectilinear operating member slidably journaled on said support member in engagement with said signal device for changing the output signal and having an outer flexible end, and coupling means connected to said outer flexible end for attachment to the pivot support means and providing for movement of the flexible end in response to the pivoting of propulsion apparatus.

4,005,675

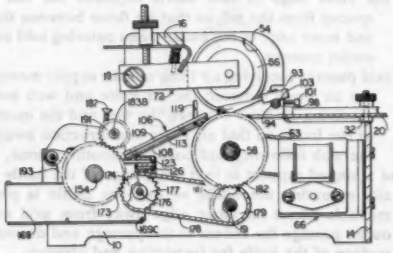
MACHINE FOR TRIMMING A COPY SHEET AND APPLYING ADHESIVE THERETO

Harold E. Sterne, 5815 Cherokee Drive, Madeira, Ohio 45243

Filed Mar. 22, 1976, Ser. No. 669,168

Int. Cl.² B05C *1/02*

U.S. Cl. 118—38 **7 Claims**



1. A machine for trimming edges from a sheet of copy and for applying adhesive to a back face of the sheet which comprises a rotatably mounted backup roll, means for guiding the sheet to the backup roll, knife means in cutting relation to the backup roll, means for turning the backup roll to cause the sheet to be drawn between the knife means and the backup roll to trim the sheet, guide receiving the trimmed sheet from the backup roll, an adhesive applying roll, an adhesive pan underlying the adhesive applying roll, means for turning the adhesive applying roll to cause a lower portion of the adhesive applying roll to dip into adhesive in the adhesive pan to pick up adhesive, and a metering blade in adhesive metering relation to the adhesive applying roll, the guide discharging the trimmed sheet onto the metering blade, the metering blade

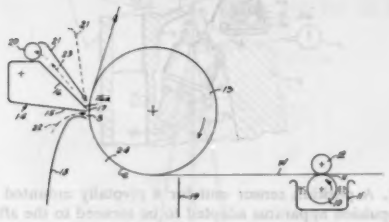
directing the sheet to the adhesive applying roll so that the trimmed sheet receives adhesive on a back face thereof.

4,005,676

AIR KNIFE COATER TOP LIP SCRUBBER

Irvin J. Phillips, South Beloit, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed May 22, 1972, Ser. No. 255,326
Int. Cl.² B05C *11/06*
U.S. Cl. 118—63 **4 Claims**



1. A coating mechanism comprising in combination, a rotary backup roll for carrying a traveling web wrapped on its outer surface through a coating smoothing zone along the periphery of the roll,

a coating applicator ahead of said zone applying liquid coating to the outer surface of the web,

an air knife smoothing mechanism extending axially along the roll at said smoothing zone positioned for directing a stream of air toward the oncoming coated web for smoothing the coating,

an air supply means ahead of the air knife for generating a cleansing flow of air over the air knife between the web and knife for carrying away airborne coating particles and preventing accumulation of said particles on the air knife,

an exhaust outlet passage extending over the surface of the air knife on its downstream side from said zone relative to the direction of travel of the web and leading away from the web and including a baffle forming one wall of the passage with a downstream surface of the knife forming the other wall of said passage,

the inner edge of said baffle adjacent the roll being spaced from the roll so that air flows between the web and inner edge of the baffle when entering said exhaust outlet passage,

said passage receiving air from said air supply means after the air flows between the air knife and web and also receiving air from between the web and the inner edge of the baffle so that air flows in a direction away from the web following said coating smoothing zone,

and a hinged support at said inner edge of the baffle pivotally mounting the baffle so that the baffle is pivotally movable about its inner edge away from said exhaust outlet passage for access to the passage and downstream surface of the knife for inspection and cleanup.

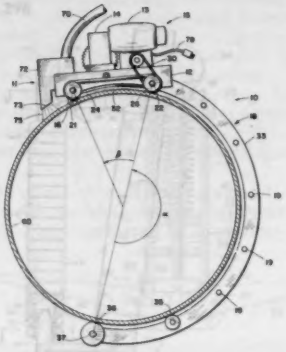
4,005,677

APPARATUS FOR CIRCUMNAVIGATING A DISPENSER ABOUT A PIPE OR THE LIKE

Robert J. Hart, Tulsa, Okla., assignor to Commercial Resins Company, Tulsa, Okla.

Filed Mar. 6, 1974, Ser. No. 448,670
Int. Cl.² B05C *5/00*, *19/00*
U.S. Cl. 118—307 **6 Claims**

1. Apparatus for carrying a dispenser circumferentially around a cylindrical object comprising, two frames hinged together to be moveable to a configuration surrounding more than one-half of the circumference of said object, said dispenser being carried upon one of said two frames in dispensing relationship with said object, a lock means connected between said two frames to secure them in surrounding position, a plurality of wheels mounted on said two frames to ride upon said object in said surrounding position, a motor carried on one of said two frames and operably connected to two of said



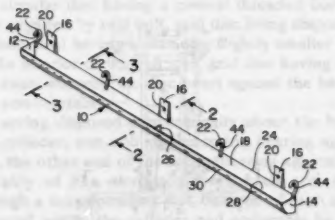
wheels to propel said frames circumferentially about said object, and a pair of flexible belts engaging said pipe in said surrounding position, each mounted between one of said motor connected wheels and another wheel to propel said two frames.

4,005,678

COATING AND STAINING MATERIAL COLLECTING DEVICE

Joseph J. O'Toole, Staten Island, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 4, 1976, Ser. No. 692,804
Int. Cl.² B05C *11/00*
U.S. Cl. 118—505 **5 Claims**



1. A coating and staining material collecting device for removable attachment to a vertical surface comprising an elongated trough, a pair of caps, one of said pair of caps fixedly secured at each free end of said elongated trough, at least one gusset, said at least one gusset fixedly secured to the interior surfaces of said trough dividing said trough into at least two separate open mouth containers, fastening means for fastening said trough to said vertical surface, said trough possessing semi-flexible properties along the longitudinal axis thereof said open mouths of said containers having a straight line marginal edge adjacent a vertically disposed marginal edge of said trough, said open mouths being disposed upwardly, said fastening means comprising a plurality of upwardly extending tapered tabs fixedly secured at the intersection of said vertical edge and said open mouthed portion, said plurality of tapered tabs being disposed in spaced apart relationship along said longitudinal axis, each of said plurality of tapered tabs having a hole located in the lateral surfaces thereof, and the narrowest portion of said each of said plurality of tapered tabs being disposed upwardly and parallel to said longitudinal axis and said intersection whereby said de-

vice is adapted to be attached through said holes or by frictional hold of said tabs inserted beneath a shingle comprising said vertical surface.

4,005,679

METHOD AND APPARATUS FOR PRE-INCUBATING EGGS

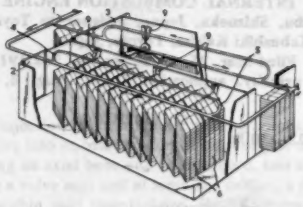
Henricus Gerhardus Hermanus Maria Pas, 's-Heerenbergseweg 13, Zeddam, Netherlands

Filed Feb. 11, 1975, Ser. No. 548,936

Claims priority, application Netherlands, Feb. 13, 1974, 740194

Int. Cl.² A01K 41/00

U.S. Cl. 119—35 **1 Claim**



1. In a method for incubating chicken eggs in an incubator in which hot air is displaced and distributed, wherein stacks consisting of a plurality of egg racks are introduced into the incubator, the stacks being maintained in said incubator during the required incubation period and then being discharged from said incubator, said racks being tilted a plurality of times, and during the incubation period of 18 days, each 3 days a group of said stacks being introduced into said incubator wherein the improvement comprises introducing said stacks into said incubator by a continuously moving conveyor, spacing equidistantly said stacks of the first group introduced on a substantially oval shaped conveyor track located inside said incubator, disposing stacks thereafter introduced on said track equidistantly apart and behind each said stack of the preceding group, and tilting each said egg rack in said incubator so that it rotates approximately 90° about a horizontal axis passing through said rack at least twice during each circulation thereof around said track.

4,005,680

EQUIPMENT FOR MILKING PARLOURS

Mark Roger Lole, Hermitage Farm, Wadborough, Worcester, England

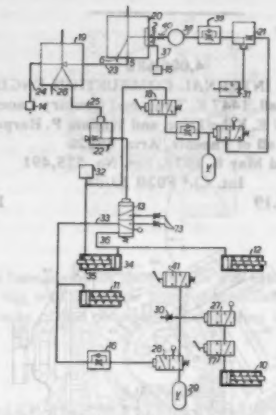
Filed June 10, 1974, Ser. No. 477,748

Claims priority, application United Kingdom, June 9, 1973, 27651/73

Int. Cl.² A01J 7/00

U.S. Cl. 119—14.08 **9 Claims**

1. Equipment for use in a milking parlour comprising cluster removal means, milk transfer means and sensing means for sensing cessation of milk flow and for transmitting a signal in response thereto to the cluster removal means and to the milk transfer means whereby cluster removal is effected, in use, on



cessation of milk flow and transfer of milk from a receiver to a bulk storage vessel is then obtained.

4,005,681

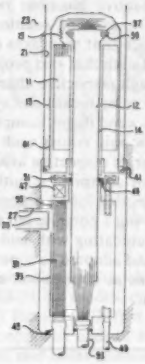
VAPOR GENERATOR

George E. Lockett, La Jolla, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed July 23, 1975, Ser. No. 598,321

Int. Cl.² F22B 1/06, 37/24

U.S. Cl. 122—32 **7 Claims**



1. In a vapor generator having first and second tube bundles subject to thermal expansion of different amounts, and having first and second structural elements also subject to thermal expansion of different amounts, a plurality of substantially helical connecting tubes communicating between the tubes in said first tube bundle and the tubes in said second bundle, support means engaging the upper portions of said helical connecting tubes for suspending said tubes on a substantially vertical axis, lever means secured to said support means, said lever means having fulcrum means displaced from said support means, actuating means engaging said lever means on the opposite side of said fulcrum means from said support means, said actuating means and said fulcrum means being secured, respectively, to said first and second structural elements and being positioned on said lever means to provide movement of

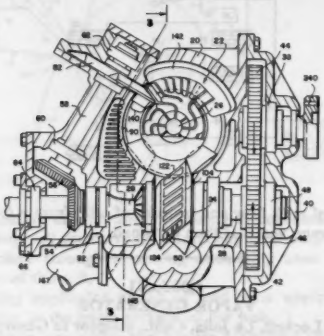
said support means for accommodating the different thermal expansions of said first and second tube bundles.

4,005,682

ROTARY INTERNAL COMBUSTION ENGINE

William B. McCall, 1447 E. Town and Country Lane; William J. Harper, 417 E. Echo Lane, and William P. Harper, 311 E. Orchid Lane, all of Phoenix, Ariz. 85020

Filed May 8, 1975, Ser. No. 575,491
Int. Cl.² F02B *53/08*
U.S. Cl. 123—8.19 16 Claims



1. In a rotary machine the combination of: a plurality of cooperating rotors; each rotor having a peripheral portion provided with a plurality of notch like chamber recess portions disposed radially inward from the respective peripheral portions; each rotor having radially projecting lobe portions disposed between respective chamber recess portions; said rotors having respective axes of rotation; means rotatably mounting said rotors such that their axes of rotation are at an angle to each other and such that said projecting lobe portions of each rotor pass through respective chamber recess portions of the other of said rotors; means for synchronizing rotary motion of said rotors; centrifugal compressor blade means internally of said rotors; said rotors each having an air compressor inlet means near its respective axis of rotation; each of said rotors having an air compressor outlet at the peripheral extremities of said projecting lobe portions; a housing for said rotors; said housing having a compressed air receiving plenum adjacent to and communicating with said peripheral portions of each of said rotors and adapted to supercharge each of said chamber recess portions as it passes in communication with said respective plenum.

4,005,683

ENERGY CONVERSION DEVICE

Raymond Douglas Whitt, 4664 19th St., San Francisco, Calif. 94114

Filed Oct. 7, 1974, Ser. No. 512,695
Int. Cl.² F02D *19/00*
U.S. Cl. 123—25 B 18 Claims

1. An energy conversion device for supplying a combustible mixture to an engine comprising:

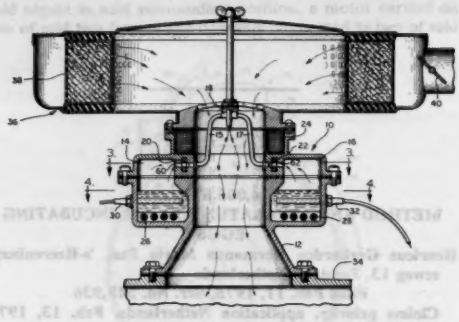
an injector body for carrying an air stream;

discharge means for directing fuel and water into the air stream of the injector body;

means for providing a supply of heated fuel to said discharge means;

means for providing a supply of heated water to said discharge means;

means for generating a randomly oriented electromagnetic field downstream of the discharge means for acting on the



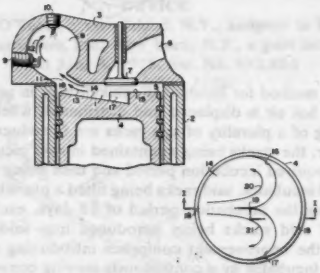
fuel and water directed into the air stream of the injector body.

4,005,684

INTERNAL COMBUSTION ENGINE

Nobuo Habu, Shizuoka, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 26, 1975, Ser. No. 562,191
Claims priority, application Japan, Aug. 8, 1974, 49-94788[U]
Int. Cl.² F02B *3/00*
U.S. Cl. 123—30 D 9 Claims

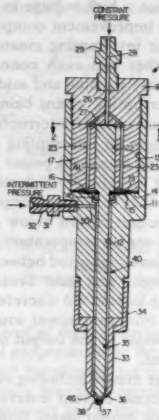


1. An internal combustion engine comprising a cylinder block having cylinder bores, a piston having a crown disposed reciprocably in each cylinder bore, a cylinder head secured onto the cylinder block, a main combustion chamber defined by the inner surface of the cylinder bore, the upper surface of the crown and the under surface of the cylinder head in each cylinder bore, an auxiliary combustion chamber formed in the cylinder head at a position above said main combustion chamber, a spark plug disposed in the cylinder head for the auxiliary combustion chamber, means for supplying fuel to said auxiliary combustion chamber, a communication passage formed in the cylinder head for fluidly communicating the main combustion chamber and the auxiliary combustion chamber, the upper surface of the crown of the piston having an entirely planar inclined portion extending gradually downward and toward the opposite side from the peripheral edge which is brought to a position adjacent to said communication passage when said piston reaches the top dead center position and a stepped portion formed at said opposite side remote from said communication passage, the inclined portion terminates at a pair of curved surfaces as the inner wall of the stepped portion, the curved surfaces being joined to each other at a point diametrically opposite to the highest point of the peripheral edge of the crown and extending away from each other to the peripheral edge of the crown.

4,005,685
FUEL INJECTION APPARATUS

Endre Kovacs; Peter Kovacs; Michael Kovacs, all of 1708 Cedar Drive; Marta Kovacs, 1707 Cedar Drive, and Geza Kovacs, 1610 Cedar Drive, all of Plant City, Fla. 33566

Filed July 29, 1975, Ser. No. 600,023
Int. Cl.² F02M 47/06
U.S. Cl. 123—33 G 5 Claims



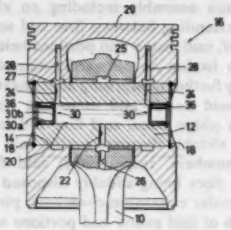
1. A fuel injection apparatus for injecting combustible fuel under pressure into an internal combustion engine comprising a body having an axial bore and counterbore, one end of said body having a valve seat and at least one orifice, a diaphragm positioned within said counterbore, sleeve means mounted within said counterbore in sealing engagement with the periphery of said diaphragm, said sleeve means and said body having opposed recesses defining a diaphragm expansion cavity, said sleeve means having an axial guide bore and at least one passage for fluid communicating with said cavity, means for introducing lubricating fluid under a predetermined constant pressure into said guide bore and through said passage into a portion of said cavity, and injector needle having first and second portions, said first portion being slidably received within the guide bore of said sleeve means, said second portion extending through and sealingly connected to said diaphragm, said second portion extending freely through and being in spaced relationship to the bore of said body and guided therethrough by the sliding engagement of said first portion of said injector needle and said guide bore of said sleeve means, a valve member at the end of said second portion which is remote from said first portion, said valve member normally engaging said valve seat, and means for intermittently introducing fuel under a pressure which is higher than said constant pressure into said bore of said body and into another portion of said cavity, whereby said high pressure fuel moves a portion of said diaphragm and said injection needle axially against the constant pressure to unseat said valve member from said seat and discharge high pressure fuel through said orifices.

4,005,686
PISTON-PIN FOR LIQUID COOLED PISTONS

Kurt Wizemann, Stuttgart, and Manfred Pfiz, Nellingen, both of Germany, assignors to J. Wizemann & Co., Quellenstr. 7, Germany

Filed June 26, 1975, Ser. No. 590,421
Int. Cl.² F01P 1/04
U.S. Cl. 123—41.38 6 Claims

6. Piston-pin for liquid cooled pistons, comprising a longitudinal bore which at its ends is sealed by cup shaped sealing elements, which are emplaced in a stressed condition, and consist of a base and a rim, the outer diameter of which rim while in the unstressed condition is slightly larger than the inner diameter of the longitudinal bore, while the wall thick-

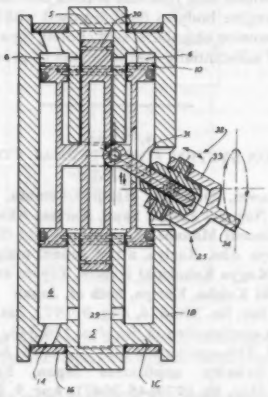


ness of the base is smaller than the rim wall thickness, and with the latter rim wall thickness being substantially less than the wall thickness of the piston-pin surrounding the longitudinal bore.

4,005,687
CONCEALED REGENERATIVE COMBUSTION ENGINE

Johan Jonathan, 22 Milton St. North, Ashfield, New South Wales, 2131, Australia

Filed Feb. 1, 1974, Ser. No. 438,841
Int. Cl.² F02B 23/00, 53/00
U.S. Cl. 123—53 A 1 Claim



1. An internal combustion engine characterized by its ability to operate in multi-stroke modes, comprising, in combination: an engine body formed with first and second end head portions disposed at opposite ends of and being integral with an outer annular wall, said outer annular wall having inwardly facing surfaces, said body including first and second spaced substantially central and concentrically extending hollow cylindrical first and second combustion walls each defining separate first and second combustion chambers therewithin, said first and second combustion walls being integral with said respective first and second engine body end head portions, said first and second combustion walls further defining first and second annular expansion chambers intermediate outer surfaces thereof and said inwardly facing surfaces of said outer annular wall, said first and second annular expansion chambers extending concentrically about said first and second combustion chambers, respectively, each of said first and second end head portions being formed with a port extending therethrough in communication with said first and second annular expansion chambers, each of said first and second combustion walls being formed with a port extending therethrough at a predetermined distance from said respective first

and second end head portions and in communication with said combustion and expansion chambers, said outer annular wall having a substantially central relief opening, a piston assembly supported for reciprocating movement within said engine body, said piston assembly including an elongated central inner portion extending between first and second piston end portions thereof, said piston end portions being integral with a central portion having an outwardly extending flange, said piston assembly further comprising an elongated outer portion integral with said flange and extending between first and second annular piston discs, said first and second piston end portions being slidably disposed within said first and second combustion chambers, respectively, said first and second annular piston discs being slidably disposed within said first and second annular expansion chambers, piston sealing rings carried by each of said piston end portions as well as each of said piston discs, said sealing rings each remaining in contact with the respective chamber with which it is associated during the entire stroke of said piston assembly, conversion means pivotally supported and disposed in part within said central relief opening for converting rectilinear reciprocatory movement of said piston assembly into arcuate movement, linkage means interconnecting said piston assembly and said conversion means, valve means associated with each of said end head portion ports for controlling the flow of fluid therethrough, the presence of said first piston end portion adjacent to said first end head portion at one extremity of the stroke of said piston assembly sealing said first combustion wall port, thereby sealing said respective combustion and expansion chambers from each other, and cooling means supported by said first engine body end head portion for transferring heat generated within said first and second combustion chambers from said engine body to fluid disposed within said first and second expansion chambers, said cooling means comprising a plurality of substantially thin members of predetermined size and shape.

4,005,688

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Noriaki Kawai, Okazaki; Hisaji Okamoto, Aichi; Yosiaki Takeda, Nagoya; Fukuzi Sano, Kariya; Akio Kakiuchi, Nagoya; Masami Manabe, Kariya; Takashi Nomura, Kariya, and Sigeya Abe, Kariya, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Nippondenso Kabushiki Kaisha, Kariya, both of, Japan

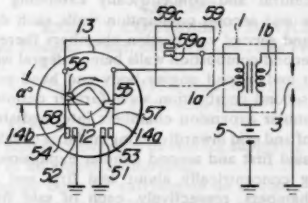
Division of Ser. No. 386,874, Aug. 9, 1973, Pat. No. 3,930,474, which is a continuation of Ser. No. 116,343, Feb. 18, 1971, abandoned. This application July 25, 1975, Ser. No. 599,127

Claims priority, application Japan, Feb. 27, 1970, 45-17189; Mar. 30, 1970, 45-30471; Apr. 9, 1970, 45-34366; Apr. 9, 1970, 45-34367

The portion of the term of this patent subsequent to Jan. 6, 1993, has been disclaimed.

Int. Cl.² F02P 5/04

U.S. Cl. 123—117 R **3 Claims**



1. An improved ignition system, in combination with a spark-ignition type internal combustion engine having at least one spark plug, to advance the spark at a selected engine temperature corresponding to a coolant temperature less than about 40° C and to retard the spark above that temperature including

an ignition coil having a primary winding and a secondary winding connectable in circuit with said spark plug,

a power source connected in circuit with said primary winding for supplying power to said primary winding, and

breaker means connected in series with the circuit including said primary winding and said power source to interrupt power supplied from said power source to said primary winding so as to induce a high voltage in said secondary winding, wherein the improvement comprises,

first and second current interrupting means connected in parallel with each other and each connected in series circuit with said primary winding and said power source, said first current interrupting means being positioned in advance of said second current interrupting means by a selected rotational angle for interrupting power supplied to said primary winding from said power source,

a temperature detecting element for detecting engine temperature having an effect on engine torque efficiency to produce respective output signals below and above said selected level of said engine temperature, and

spark timing change means connected between said temperature detecting element and said breaker means for changing spark timing to selected discrete levels to interrupt power supplied from said power source to said primary winding in response to the output of said temperature detecting element,

said spark timing change means including switch means for switching off said second current interrupting means in response to said below output signal from said temperature detecting element for advancing said spark timing from a normal pre-TDC level to a selected discrete level that is more advanced by about 5° to 15° when the engine temperature is lower than said selected engine temperature for improving the power of said engine by generally optimizing engine shaft torque regardless of engine load and increasing the stability at idling and during acceleration and running speeds of said engine at temperatures thereof below said selected engine temperature,

said switch means being operative in response to the said above temperature output signal to switch on said second current interrupting means and thereby to render said second current interrupting means operative for retarding said spark timing to said normal level when said engine temperature is above said selected temperature,

said switching means having a single pole and a single contact for a single throw action, said single pole being connected directly to said primary winding and to said first current interrupting means, and said single contact being connected to said second current interrupting means.

4,005,689

FUEL INJECTION SYSTEM CONTROLLING AIR/FUEL RATIO BY INTAKE MANIFOLD GAS SENSOR

Daniel Dewey Barnard, Farmington Hills, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Apr. 30, 1975, Ser. No. 573,509

Int. Cl.² F02M 25/00

U.S. Cl. 123—119 A **3 Claims**

1. In a fuel injection system, a system for controlling the air/fuel ratio in response to an amount of a constituent gas content of the mixture in the intake manifold of the engine comprising:

an internal combustion engine including;

a plurality of cylinders,

air intake means for receiving and controlling ambient air for combustion,

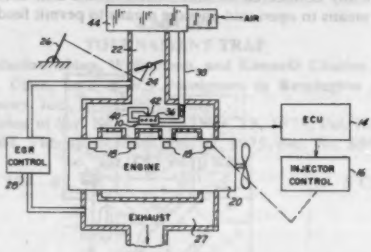
exhaust gas recirculation means connected to said air intake means for supplying an amount of exhaust gas to the ambient air in said air intake means forming a gas mixture, and

intake manifold means for distributing said gas mixture to said cylinders said intake manifold means connected to said air intake means downstream of said exhaust gas recirculation means connection;

fuel injector means;

means for supplying the fuel to said fuel injector means;

a gas sensor means positioned in said intake manifold means and adjacent said air intake means and comprising means for supplying ambient air to one surface thereof, said gas sensor means responsive to all of the flow to another



surface thereof of the gas mixture for generating an electrical signal proportional to the difference in the amount of the sensed constituent gas in said gas mixture flowing into the intake manifold means and the amount of the sensed constituent gas in the ambient air, and

control means responsive to said electrical signal for controlling the operation of said fuel injector means thereby controlling the operation of said fuel injector means in accordance with the amount of said sensed constituent gas in said gas mixture in the intake manifold means.

4,005,690

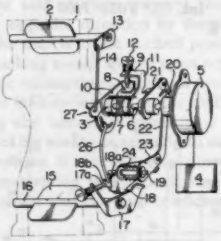
AUTOMATIC CHOKE VALVE APPARATUS IN AN INTERNAL COMBUSTION ENGINE

Yoshiaki Hirosawa, Tokyo; Toshio Nomura, Niiza, and Masahiko Iiyama, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 23, 1975, Ser. No. 589,515

Int. Cl.² F02M *1/10*; F02D *11/08*; F02M *23/04*

U.S. Cl. 123—119 F **10 Claims**



1. Choke valve apparatus for an internal combustion engine comprising a rotatable choke valve, drive means for said choke valve including means for said choke valve including means for directly rotating the choke valve only in one direction of rotation of the drive means, and a spring rotatably coupling the drive means and said choke valve for rotation in the other direction, said choke valve being initially driven in reverse direction by said drive means in preparation for engine starting, to a fully closed position, the drive means undergoing continued excess rotation in reverse direction to place said spring under stress, a fast idle cam adapted for cooperating with a throttle valve for the engine and including an extended portion of relatively great height constituting a low temperature cam portion and means coupling said fast idle cam with said drive means so that the low temperature cam portion is in operative position when the drive means undergoes said excess rotation.

4,005,691

CONTROL INSTALLATION FOR EXHAUST GAS RECYCLING

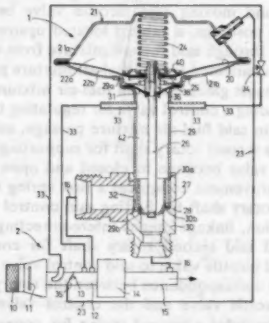
Gerhard Stumpp, Stuttgart, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Mar. 25, 1974, Ser. No. 454,367

Claims priority, application Germany, Apr. 14, 1973, 2318917

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **3 Claims**



1. In a control installation for internal combustion engines having exhaust gas recycling, the engine including:

a. suction tube;

b. an arbitrarily settable throttle flap valve mounted within the suction tube, the throttle flap valve setting being dependent on the load condition of the engine; and

c. an exhaust gas pipe; the installation including:

d. an exhaust gas recycling valve whose setting is dependent on the pressure in the suction tube; and

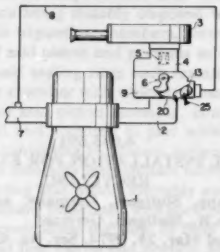
e. a return line leading from the exhaust gas pipe to the recycling valve and from the recycling valve to the suction tube, the return line being connected to the suction tube downstream of the throttle flap valve, the improvement in the installation comprising a bypass line which extends from the suction tube upstream of the throttle flap valve to the recycling valve and back to the suction tube downstream of the throttle flap valve, with the air passing through the bypass line serving as an engine supply during engine idling and to cool the recycling valve; and

f. a control line having a first end thereof connected to the recycling valve and another end connected to the suction tube upstream of and proximate to the throttle flap valve so that the pressures prevailing in the immediate region of the throttle flap valve are communicated to the recycling valve.

4,005,692
CARBURETOR ARRANGED FOR RECIRCULATING EXHAUST GASES

Hidetaka Nohira, and Masatoshi Sugiura, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 481,323, June 20, 1974, abandoned.
This application May 19, 1975, Ser. No. 578,752
Claims priority, application Japan, July 5, 1973, 48-75221
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A 4 Claims



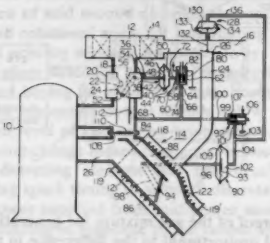
1. In a carburetor comprising a carburetor barrel forming a fuel-air mixture passage, a throttle valve located within said fuel-air mixture passage for controlling the flow of the mixture therethrough, said throttle valve including a first rotary shaft for supporting and moving said throttle valve between its closed and open positions, a venturi located upstream in the direction of flow through said fuel-air mixture from said throttle valve, means connected to said fuel-air mixture passage for recirculating exhaust gases into said fuel-air mixture passage, said means including a control valve for regulating the flow of exhaust gases into said fuel-air mixture passage, said control valve including a second rotary shaft for supporting and moving said control valve between its closed and open positions, wherein the improvement comprises a first spring connected to said second rotary shaft for biasing said control valve into the closed position, linkage means interconnecting said first rotary shaft and said second rotary shaft for coupling the operation of said throttle valve to said control valve for effecting a one-to-one correspondence between the rotary displacement of the throttle valve and the control valve and said linkage means includes a second spring for connecting said linkage means to said second rotary shaft so that said throttle valve can operate independently of said control valve so that said throttle valve can rotate though rotation of said control valve is prevented.

4,005,693
WARMING-UP SYSTEM FOR INTERNAL COMBUSTION ENGINES

Kenji Masaki, and Masaaki Saito, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jan. 28, 1974, Ser. No. 437,157
Claims priority, application Japan, Jan. 29, 1973, 48-11697
Int. Cl.² F02M 31/00
U.S. Cl. 123—122 D 6 Claims

1. A warming-up system for an internal combustion engine, comprising an engine intake passageway having a throttle valve rotatably mounted therein, an engine exhaust gas passageway, a combustible mixture heating device comprising an exhaust gas by-pass passageway connected at both ends to said exhaust gas passageway and sharing a common heat transfer wall with said intake passageway downstream of said throttle valve through which wall engine exhaust gases heat a combustible mixture passing through said intake passageway when diverted into said exhaust gas by-pass passageway, an exhaust gas valve rotatably mounted in said exhaust gas passageway to normally open it, a servo unit operatively connected to said exhaust gas valve, passage means communicating with said intake passageway downstream of said throttle valve and with said servo unit to feed thereto a vacuum prevailing in said intake passageway, said servo unit being operable by said vacuum to rotate said exhaust gas valve to close said exhaust gas passageway to divert engine exhaust gases into said exhaust gas by-pass passageway, first switch means closed in response to a temperature of the engine lower than a predetermined value, and valve means disposed in said passage means to normally close said passage means to inhibit feed of said vacuum to said servo unit and having a solenoid which is electrically connected to said switch means and causes said valve means to open said passage means to permit feed of said

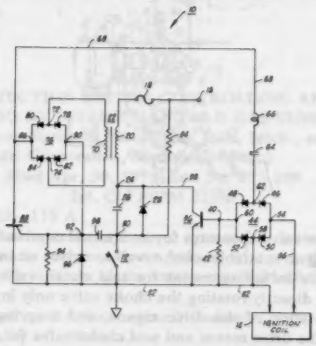


vacuum to said servo unit when said switch means is closed, and an ignition timing change-over device comprising an advancing breaker contact assembly normally connected to an ignition coil of the engine, a retarding breaker contact assembly normally disconnected from said ignition coil, second switch means closed in response to a temperature of a catalytic converter of the engine lower than a predetermined value and connected in parallel with said first switch means, and control means connected to said second switch means and operable to change over connection of said ignition coil from said advancing breaker control assembly into said retarding breaker control assembly when said second switch means is closed.

4,005,694
ELECTRONIC IGNITION SYSTEM

John B. Noe, Norman, Okla., assignor to The Plasmatronics Company, Norman, Okla.

Filed Aug. 18, 1975, Ser. No. 605,533
Int. Cl.² F02P 1/00
U.S. Cl. 123—148 E 11 Claims



1. An electronic ignition circuit for use in combination with an internal combustion engine having an electrical power source and ignition means for energization of at least one spark discharge device, comprising:

a capacitor;

switch means actuatable between open and closed positions;

means including a transformer connected to said power source and energized by said switch in the closed position to charge said capacitor to an increased voltage value;

controlled rectifier means energized by opening said switch means to effect discharge of said capacitor; and

bridge rectifier means connected to conduct current from discharge of said capacitor to said ignition means while clamping the instantaneous voltage value relative to ground.

4,005,695

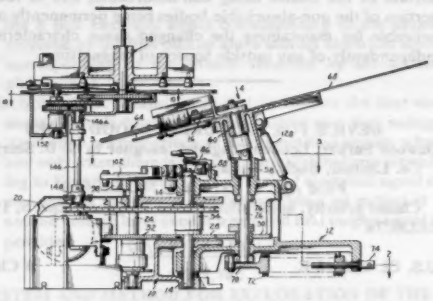
TOURNAMENT TRAP

James Marion Alday, Williamson, and Kenneth Charles Rowlands, Utica, both of N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Division of Ser. No. 417,185, Nov. 19, 1973, Pat. No. 3,937,204. This application June 12, 1975, Ser. No. 586,207

Int. Cl.² F41B *3/04*

U.S. Cl. 124—8 **5 Claims**



1. A target throwing trap comprising a housing, a main shaft mounted on said housing, a target throwing arm secured on one end of said shaft, a crank arm secured to the other end of said shaft, a mainspring connected to said crank arm and to said housing, cocking means for rotating said shaft and associated throwing arm and crank arm so as to tension the mainspring and cock the throwing arm, means associated with said cocking means for stopping the rotation of the shaft just before the axis of the mainspring reaches the top dead center line, means on said shaft to prevent the shaft from being rotated in the opposite direction by the action of the mainspring when the trap is in the cocked position, and means to actuate said cocking means so that upon actuation said shaft is rotated until the mainspring axis passes overcenter whereupon the force of the mainspring acts on the shaft and throwing arm thus providing the necessary centrifugal force to throw a target, said cocking means continuing to rotate the shaft until the cocked position is reached whereupon shaft rotation is stopped, the mainspring is tensioned and held just short of overcenter position and the trap is cocked and ready to be fired again.

4,005,696

COMPOUND BOW

Thomas Paul Jennings, Sun Valley, Calif., assignor to Jennings Compound Bow, Inc., Valencia, Calif.

Filed Mar. 28, 1975, Ser. No. 562,816

Int. Cl.² F41B *5/00*

U.S. Cl. 124—24 R **23 Claims**

1. In a compound bow having a center portion with a handle formed thereon, a lower limb and an upper limb connected to said center portion, and eccentrically mounted bow string pulleys mounted at the outer ends of each of said limbs for supporting a cable and bow string, the improvement comprising:

bow string holder means constructed and disposed to be supported by each of said eccentrically mounted pulleys;

each of said bow string holder means having shaft means and constructed to be connected at its outer end through the cable to one of said pulleys;

the bow string holder means further including a pair of aligned bow string support means each extending at its inner end from an opposite side of said shaft means;

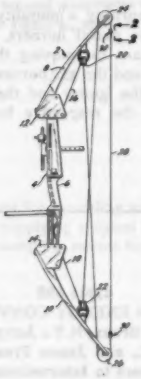
each of said support means having an upwardly extending outer end which is shaped and positioned in spaced relationship to the shaft means to maintain the bow string between said outer end and said shaft;

curved upper surface means on each of said support means;

said upper surface means curving upwardly toward the outer end of said shaft means to merge into the surface of said shaft;

said upper surface means also curving upwardly toward said upwardly extending outer end of the support means to merge into the surface of said outer end and to define with the upper end of the support means and the shaft means a recess for receiving the bow string;

transversely curved outer side surface means on each of said support means for facilitating the disposition of the bow string in frictional relationship with the support means along an extended length of the bow string;



said transversely curved outer side surface means merging smoothly into said upper surface means on each of the support means for facilitating the disposition of the bow string in frictional relationship with the support means along an extended length of the bow string;

lower curved surface means on each of said support members;

the lower surface means on said support means merging together to form a continuous and straight lower surface extending across the bottom of said bow string holder means for facilitating the disposition of the bow string in symmetrical relationship with the shaft means, and

said transversely curved outer side surface means on each of said support means merging smoothly into the curved lower surface on the support means for facilitating the disposition of the bow string in frictional relationship with the support means along an extended length of the bow string,

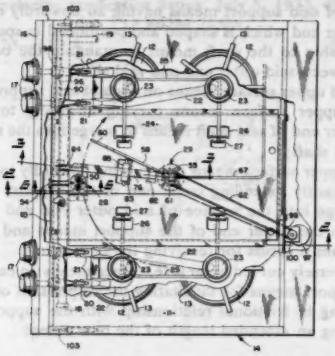
said upper surface means, and transversely curved outer side surface means, and said lower surface means being constructed and disposed to provide a relatively uniform contact between the bow string and the bow string holder means along the extended length of the bow string holder means for facilitating a uniform support for the bow string in a symmetrical relationship to the shaft means and for preventing stress concentrations in the bow string in its engagement with said bow string holder means.

4,005,697

GAS COOK TOP

Richard L. Perl, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio

Filed Feb. 9, 1976, Ser. No. 656,540
Int. Cl.² F24C 3/00
U.S. Cl. 126—39 E **28 Claims**



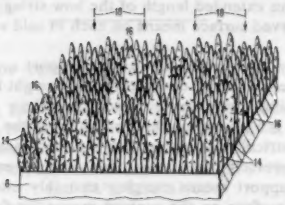
1. A cook top comprising a plurality of gas burners, an electric igniter for the plural burners, movable pilot light means, and drive means for moving the pilot light means relative to the igniter and the gas burners such that the pilot light means is lit by the igniter and the latter brought into ignition proximity to the respective burners to ignite any turned on.

4,005,698

PHOTON ENERGY CONVERTER

Jerome John Cuomo, Bronx, N.Y.; Jerry MacPherson Woodall, Saratoga, Calif., and James Francis Ziegler, Putnam Valley, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 18, 1974, Ser. No. 515,780
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 **22 Claims**



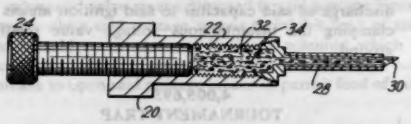
1. An efficient broad band absorber of photons, comprising;
a thermally conductive substrate;
a dendritic distribution of material on said thermally conductive substrate, said distribution including effectively aligned needle-like protrusions extending from said substrate and arrayed in a random pattern thereover, the density of said protrusions being such that their individual height and width dimensions as well as their respective separations are of the order of a few incident photon wavelengths such that said protrusions act as a broad band photon absorber to convert the energy of said photons to heat in said thermally conductive substrate.

4,005,699

METHODS AND APPARATUS FOR USE IN MAGNETIC TREATMENT OF THE BODY

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Filed Oct. 9, 1974, Ser. No. 513,295
Int. Cl.² A61M 5/00
U.S. Cl. 128—1.3 **8 Claims**



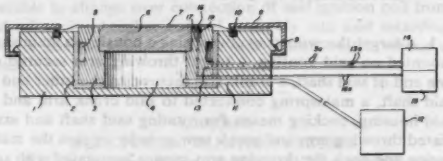
1. In a method of treating a living being, the step of injecting with a syringe, into tissue of the living being, an absorbable viscous substance, in which a plurality of solid bodies are suspended to an extent sufficient to be distributed throughout the viscous substance, in an amount sufficient to change the characteristics of the tissue receiving the injection, at least a portion of the bodies being non-absorbable, and at least a portion of the non-absorbable bodies being permanently magnetizable for maintaining the changed tissue characteristics independently of any outside source of magnetism.

4,005,700

DEVICE FOR MEASURING BLOOD GASES

Dawood Parker, London, England, assignor to G. D. Searle & Co. Limited, Bucks, England

Filed Apr. 7, 1975, Ser. No. 566,008
Claims priority, application United Kingdom, Apr. 5, 1974, 15233/74
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 E **6 Claims**



1. A device for the measurement of the partial pressure of gases or vapours in the blood stream of animals, including man, said device comprising a body having a boundary wall which can be placed on the skin of an animal and an internal collecting chamber in which gases or vapours which diffuse through an area of skin defined by the boundary wall can be collected, heating means in the body operable to heat said area of skin, an outlet from the collecting chamber through which gases or vapours collected in the chamber can be led away to an analysis instrument, control means responsive to the temperature of said body of the device and operable to control said heating means, and means responsive to the temperature of the skin of the animal and connected with an indicator operable to monitor said temperature.

4,005,701

NOISE REJECTING ELECTRONIC SPHYGMOMANOMETER AND METHODS FOR MEASURING BLOOD PRESSURE

Sol Aisenberg, Natick, and Ronald W. Chabot, Winchester, both of Mass., assignors to Whittaker Corporation, Los Angeles, Calif.

Filed June 11, 1975, Ser. No. 585,889
Int. Cl.² A61B 5/02
U.S. Cl. 128—2.05 G **29 Claims**

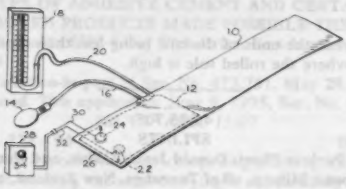
1. In a sphygmomanometer having a cuff, a cuff inflating bladder and a bladder pressure measuring element, where the

cuff is adapted for positioning around a patient's limb, for measuring the patient's blood pressure intensity by monitoring Korotkoff sounds as bladder pressure is slowly reduced from above systolic blood pressure, the improvement comprising:

a first acoustical pickup disposed within the cuff and positioned relative to a patient's brachial artery to pick up said Korotkoff sounds;

a second acoustical pickup disposed within the cuff and positioned away from the brachial artery to pick up background sounds;

transducing means associated with said pickups for producing a first electrical signal corresponding to the sounds received by the first pickup and a second electrical signal corresponding to the sounds received by the second pickup; and



electronic logic means connected to receive the first and second signals for providing an output at a first voltage level upon a comparison of said electrical signals when and only when there is a first electrical signal corresponding to Korotkoff sounds and no second electrical signal of comparable magnitude and for providing an output at a second voltage level except when said first output signal is provided.

4,005,702

SYSTEM AND METHOD FOR EXPLORATION OF THE INTRATHORACIC VENTILATORY MECHANISM

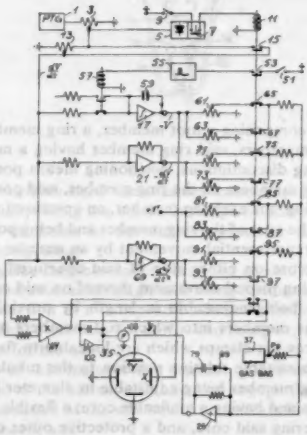
Daniel Ernest Louis Bargeton; P. Valda, both of Paris, and G. Vardon, Neuilly Plaisance, all of France, assignors to Institut National de la Sante et de la Recherche Medical, France

Filed May 22, 1975, Ser. No. 579,971

Claims priority, application France, May 22, 1974, 74.17785

Int. Cl.² A61B 5/08

U.S. Cl. 128—2.08 19 Claims



1. A method of exploring the intrathoracic ventilatory mechanism of a subject comprising the steps of producing a signal y formed at least according to the equation:

$$y = \lambda_1 V + \lambda_2 \frac{dV}{dt} + Pp + \lambda_3$$

wherein V is the volume displaced in the mouth of the subject, dV/dt is the first derivative of V with respect to time, Pp is the pleural pressure given by an oesophageal gas-bag, and λ_1, λ_2 and λ_3 are adjustable parameters, displaying the signal y as a function of V on an oscilloscope so that a loop is traced on the screen of the oscilloscope then successively adjusting the parameter λ_2 so that the loop traced an the oscilloscope screen closes in a straight line, adjusting the parameter λ_1 so that the straight line becomes horizontal, and adjusting the parameter λ_3 so that the horizontal straight line lies over the x axis on the oscilloscope screen whereby the adjusted values of the parameters are:

λ_2 = R-intrathoracic resistance, λ_1 = E-intrathoracic elastance, and $\lambda_3 = E(Vo - Vr)$—where Vo is the pulmonary volume at the beginning of the inhalation and Vr is the relaxation volume.

6. A system for exploring the intrathoracic ventilatory mechanism of a subject, comprising pneumotachograph means for supplying a signal dV/dt of the first derivative with respect to time of the volume V displaced at the mouth of the subject, integrating circuit means for receiving the signal dV/dt and supplying a signal $-V$, first parameter means for providing an adjustable parameter signal λ_1 and providing an output signal $-\lambda_1 V$; second parameter means for providing an adjustable parameter signal λ_2 and providing an output signal

$$-\lambda_2 \frac{dV}{dt},$$

third parameter means for providing an adjustable parameter signal λ_3, means for supplying a signal Pp of the pleural pressure of the subject, summing means for receiving at least the signal $-\lambda_1 V$,

$$-\lambda_2 \frac{dV}{dt},$$

Pp and λ_3 for supplying a signal

$$y = \lambda_1 V + \lambda_2 \frac{dV}{dt} + Pp + \lambda_3,$$

and oscilloscope means having a vertical input for receiving the signal y and a horizontal input for receiving the signal $-V$, whereby the signal y is displayed on the screen of the oscilloscope means as a function of V in the form of a loop, said second parameter means being adjusted so that the loop is closed in a straight line, said first parameter means being adjusted so that the straight line becomes horizontal and the third parameter means being adjusted so that the horizontal line lies on the x axis of the oscilloscope means whereby the adjusted values of said first, second and third parameter means represent λ_1 =E-intrathoracic elastance, λ_2 =R-intrathoracic resistance, and $\lambda_3 = E(Vo\text{-}Vr)$ where Vo is the pulmonary volume at the beginning of inhalation and Vr is the relaxation volume.

4,005,703

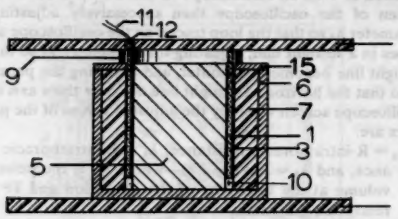
VIBRATORY MASSAGE THERAPEUTIC DEVICE

Arnold Rosen, 580 Christie St., Apt. 510, Toronto, Ontario, Canada (M6G3E3), and William Harvey Harris, 2641 Widemarr Road, Mississauga, Ontario, Canada (L5J1M4)

Filed June 4, 1975, Ser. No. 583,520

Int. Cl.² A61H *1/00*

U.S. Cl. 128—33 **6 Claims**



1. In an electrically powered vibrator massage therapeutic device the combination of a resilient supporting material encasing and supporting a plurality of electrically operable vibrator units the frequency of mechanical vibration of which is substantially the same as the frequency of electrical voltage applied thereto by an electrical power supply, and electrical power supply as aforesaid, the output voltage of which varies cyclically with time in accordance with the setting of preselectable control means, the power output of which is preselectable between a low level and the maximum allowable dissipation of the combination of vibrator units within the vibrator massage therapeutic device, the electrical power supply driving the said vibrator units; said vibrator unit including a stator having a permanent magnet with longitudinally oriented magnetic poles and stator casing of magnetically permeable material providing a return magnetic path for magnetic flux from one pole of the magnet to the other a driver coil assembly comprising a multiturn coil mounted on a tube which is adapted to vibrate with little friction longitudinally along the pole axis of the permanent magnet, the driver coil assembly remaining substantially within the stator, the outer surface of the coil assembly being of low friction material permitting substantially free vibration in cooperation with the inner liner of the stator casing, the upper section of the coil assembly being attached to a substantially rigid thin mechanical excitation plate wider than the stator casing, a flexible resilient material preventing contact of excitation plate and stator casing, a second mechanical excitation plate attached to the underside of the stator unit, the electrical excitation by time varying electrical power causing the driver coil assembly to vibrate correspondingly along the longitudinal magnetic axis.

4,005,704

DEVICE FOR THE FOOT END OF A LEG CAST

Christoph Stöhr, Eisenstr. 2, and Klaus Kerkrath, Tannenweg 3, both of 6619 Losheim, Germany

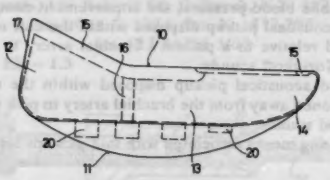
Filed Sept. 3, 1975, Ser. No. 609,955

Claims priority, application Germany, Sept. 11, 1974, 2443416; Feb. 17, 1975, 047573

Int. Cl.² A61F *5/04*

U.S. Cl. 128—83.5 **6 Claims**

1. A device for the foot end of a leg cast comprising a flexible overshoe adapted to be removably placed over the foot end of the cast, said overshoe having a rolled sole bounded in the longitudinal direction by a downwardly curved line extending from the heel portion to the tow portion of said overshoe and being flat in the transverse direction, said rolled sole having an anti-slip section on the surface which comes into contact with the ground and further having air chambers recessed into the surface which comes into contact with the cast-covered sole of the foot, said chambers forming at least one row in the longitudinal direction with the depth of the



chambers at the ends of the row being less than those in the portion where the rolled sole is high.

4,005,705

SPLINTS

Douglas Paviour Short; Donald James Gillon, and Henry Britton Coates Milsom, all of Tauranga, New Zealand, assignors to Fisher & Paykel Limited, Auckland, New Zealand

Continuation of Ser. No. 67,958, Aug. 28, 1970, abandoned. This application Sept. 10, 1975, Ser. No. 611,890

Claims priority, application New Zealand, Aug. 29, 1969, 157633

The portion of the term of this patent subsequent to Mar. 1, 1992, has been disclaimed.

Int. Cl.² A61F *5/04*

U.S. Cl. 128—87 R **2 Claims**

1. A splint comprising a foot member, a ring member, and a pair of leg members, said ring member having a malleable core and being discontinuous, positioning means positioning the pair of leg members on the ring member, said positioning means including, for each leg member, an apertured member passing over the core of the ring member and being positioned to prevent circumferential movement by an annular enlargement of the core on either side of said apertured member while permitting pivotal movement thereof on said core, said leg members being adjustable in length by providing telescopic tubular members into which rod members may telescope, compression clamps which are lockable to fix the rod members at a suitable relative position to the tubular members, said ring member being adjustable in diameter by being discontinuous and having a malleable core, a flexible resilient material covering said core, and a protective outer covering, the resilient material being divided over the discontinuity between the ends of the core, the divided portions being adapted to be fixed to each other with a fastening material, said positioning means in use restraining movement of said leg

members around the periphery of said ring member but allowing pivoting relative to the plane of the ring member, the arrangement permitting adjustment of length of the leg members and adjustment of the obliquity of the ring member relative to the leg members to assist in adapting the splint to a patient.

4,005,706

TYPE OF ADHESIVE CEMENT AND CERTAIN IMPROVED PRODUCTS MADE POSSIBLE THEREBY

David F. Smith, 6511-1 Bay Club Drive, Fort Lauderdale, Fla. 33308

Continuation-in-part of Ser. No. 473,751, May 28, 1974, abandoned. This application June 9, 1975, Ser. No. 585,382
Int. Cl.² A61L *15/07*
U.S. Cl. 128—90 10 Claims

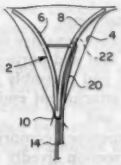
1. An orthopedic bandage comprising a thin, porous, flexible, inert backing material carrying a substantially uniform discontinuous spread of an intimate mixture of a dry, finely-divided zinc oxide and a dry, finely-divided, essentially non-allergenic, non-toxic, rapidly water-wettable and very water-soluble, weak polycarboxylic acid, the proportion of zinc oxide to acid being from that which is chemically equivalent to the acid up to 300 per cent in excess of its equivalent, the amount of the spread being from 70 to 250 grams per 5 square feet of backing, said mixture being such as to become rapidly adhesive when wet with water at room temperature and shortly thereafter to set forming a strong, firm mass.

4,005,707

VARIABLE SIZE INTRAUTERINE CONTRACEPTIVE DEVICE

Thomas S. Moulding, Jr., 1954 Glencoe St., Denver, Colo. 80220

Filed May 30, 1975, Ser. No. 582,261
Int. Cl.² A61F *5/24*
U.S. Cl. 128—130 14 Claims



1. A variable-sized intrauterine contraceptive device for substantially filling the uterus in the plane thereof and having minimal thickness in the anterior-posterior direction, said device comprising:

an angular member having first and second legs interconnected at an acute angle and being bendable at said interconnection to a collapsed position to facilitate insertion of said device into the uterus and being expandable in the plane of the uterus;

means in said member for expanding said member in the plane of the uterus until said legs engage the uterine wall irrespective of the size of the uterus in which said device is placed; and

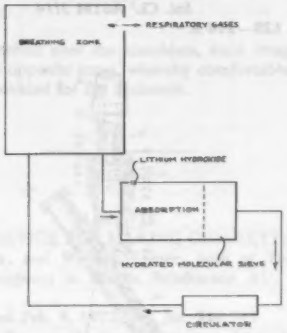
means to lock said legs to prevent further expansion thereof after they are in engagement with the uterine walls but permitting said legs to move toward said collapsed position upon contraction of the uterus.

4,005,708

APPARATUS FOR ENDOTHERMAL ABSORPTION OF CARBON DIOXIDE

Loyal G. Netteland, East Aurora, and Clifford E. Heintz, Buffalo, both of N.Y., assignors to A-T-O Inc., Willoughby, Ohio

Continuation-in-part of Ser. No. 464,738, April 29, 1974, Pat. No. 3,906,945. This application Sept. 22, 1975, Ser. No. 615,608
The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.
Int. Cl.² A62B *19/00*
U.S. Cl. 128—142 R 6 Claims



1. Apparatus for absorbing carbon dioxide from respiratory gases in a recirculatory breathing apparatus comprising:

a. means including a recirculatory gas stream flow path extending from a breathing zone to a carbon dioxide absorption zone and back to said breathing zone;

b. means for introducing to said breathing zone carbon dioxide containing respiratory exhalations;

c. means for removing from said breathing zone respiratory exhalations;

d. means for causing said exhalations to flow in said recirculating gas stream flow; and

e. said carbon dioxide absorption zone comprising a first chamber containing lithium hydroxide and downstream immediately thereafter a second chamber containing hydrated molecular sieve containing about 40 to 60 moles, per mole of said sieve, of water, whereby said carbon dioxide is caused to react with said lithium hydroxide at least in part by the reaction:

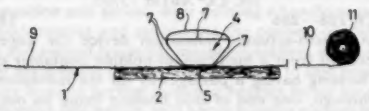
$$LiOH + CO_2 \rightleftarrows {}^{H_2O} LiHCO_3$$

4,005,709

COMPRESSION BANDAGE

Asmund Sigurd Laerdal, Stavanger, Norway

Filed Apr. 2, 1976, Ser. No. 673,094
Claims priority, application Germany, Apr. 11, 1975, 2515786
Int. Cl.² A61F *13/00*
U.S. Cl. 128—155 12 Claims



1. A compression bandage comprising a bandage strip having first and second sides, a pressure piece consisting of a molding of slightly deformable and slightly absorbent material firmly attached to said first side, and an absorbent layer fixed

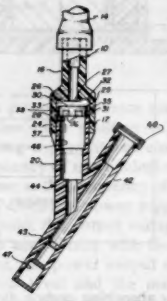
on said second side of said bandage strip in the region of said pressure piece whereby when the bandage is applied and the strip wound around the injured part, the pressure pad exerts pressure through the strip and absorbent layer onto the wound.

4,005,710

PARENTERAL APPARATUS WITH ONE-WAY VALVE

Armand Al Zeddies, Richmond, Va., and Andrew John Muettertis, Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Feb. 12, 1975, Ser. No. 549,408
Int. Cl.² A61M 5/14
U.S. Cl. 128—214 R **11 Claims**



1. A one-way valve for use in an apparatus for administering a parenteral solution to a patient comprising a valve body defining opposing end walls and a lateral wall surface with an intake orifice and an outlet orifice in said end walls, a freely movable, flexible valve member having a substantially thin body section with a width of a given dimension positioned between said end walls and spaced from said lateral wall surface, said valve member presenting a substantially solid surface portion facing said intake orifice, a plurality of substantially, uniformly spaced projections extending from said body section in one direction from one side of said valve member and inwardly over said body section within the extended confines of said body section to define a plurality of uniformly spaced openings between said projections in the valve member facing the outlet orifice, said projections having approximately the same height as said given width dimension for said body section and another projection extending from said body section from the other side thereof in a direction opposite to said plurality of projections and positioned substantially centrally with respect to said body section, said valve member constructed and arranged to be freely positioned in said valve body without substantial contact with said lateral wall surface of said valve body.

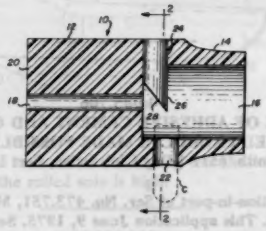
4,005,711

INHALATION DEVICE

Albert Glenn, San Francisco, Calif., assignor to Syntex Puerto Rico, Inc., Humacao, P.R.

Filed Jan. 13, 1975, Ser. No. 540,918
Int. Cl.² A61M 13/00
U.S. Cl. 128—266 **18 Claims**

1. A breath-actuated inhalation device for dispensing a medicament from a medicament-holding container comprising a housing having a passageway for the movement of air therethrough, one end of said housing being an output end adapted for insertion into the mouth or nasal passages of a user thereof; said passageway terminating in an emptying chamber adjacent the output end of said housing, the cross-sectional area of said passageway being less than the cross-sectional area of said emptying chamber; aperture means extending through a side wall of said housing and opening into said emptying chamber for receiving a medicament-holding container; and means extending into said emptying chamber adjacent the interface thereof with said passageway and transversely thereto a distance into the projected air flow path of the air stream exiting from said passageway for deflecting only



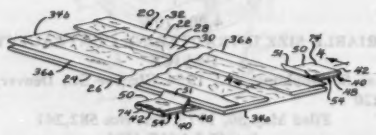
a portion of the air being drawn through said passageway during inhalation into said aperture means whereby, during inhalation, only a portion of the air drawn through said passageway is deflected by said deflecting means into a medicament-holding container held within said aperture means to cause medicament held therein to be dispensed therefrom.

4,005,712

DISPOSABLE DIAPER WITH ADJUSTABLE TAPE FASTENER

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,438
Int. Cl.² A61F 13/16
U.S. Cl. 128—284 **11 Claims**



9. A disposable diaper comprising:
an absorbent pad assembly having opposed surfaces, and a side edge; and
a tape fastener comprising,
an elongated pressure-sensitive tape strip having an adhesive surface, a first end portion secured to one of said surfaces of the pad assembly adjacent said side edge, and a second attachment end portion extending past said side edge, and
and adjustment member comprising an elongated sheet having a first section fixedly attached to said diaper, and a second section releasably attached to an adhesive area on said second strip portion, with said second sheet section being spaced from an end of said second strip portion to expose a region of adhesive for use in securing the diaper about an infant, and with said second sheet section being peelable from said strip to selectively enlarge said region of adhesive.

4,005,713

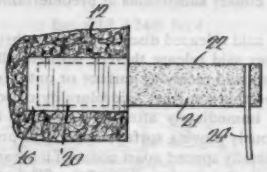
DISPOSABLE DIAPER HAVING TAB FASTENERS PROVIDED WITH A PULL STRING AND ATTACHED TO RELEASE SURFACES ON DIAPER FACING

Frederick K. Mesek, Downers Grove, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 8, 1975, Ser. No. 539,487
Int. Cl.² A61F 13/16
U.S. Cl. 128—287 **6 Claims**

1. A disposable diaper which comprises a moisture-

impermeable backing sheet forming a diaper outside surface for direction away from an infant when the diaper is worn by that infant, a moisture-retaining layer adhered to the backing sheet and having a fibrous facing which forms a diaper inside surface for direction toward the infant, a release region directly on said fibrous facing and situated on and extending



inwardly from longitudinal margin of the diaper, tab fastener means having a fixed end secured to said diaper backing sheet and a free working end removably attached to said release region, and pull string means attached to said free working end for separating said free working end from the underlying release region.

4,005,714

BIPOLAR COAGULATION FORCEPS

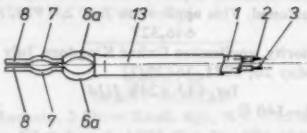
Siegfried Hiltebrandt, Knittlingen, Germany, assignor to Richard Wolf GmbH, Knittlingen, Germany

Filed July 30, 1975, Ser. No. 600,462

Claims priority, application Germany, May 3, 1975, 2519827

Int. Cl.² A61N *3/04*; A61B *17/28*

U.S. Cl. 128—303.17 **8 Claims**



1. Bipolar frequency coagulation forceps for the coagulation of the Fallopian tubes, said forceps including two insulated current conductors affording a pair of resiliently spreading forceps arms which are closed by relative longitudinal shifting of an actuating sleeve accomplished with the aid of a handle, portions of the forceps arms located proximally to free ends of the conductors being insulated and each having a first curvature for closing the forceps by means of said sleeve, and having insulation-free second curvatures of less diameter than said first curvature located between said first curvature and said free end for clamping a Fallopian tube, and the free ends of the conductors being straight and insulation-free, adapted during the closing of the forceps to be placed approximately parallel to one another on opposite sides of the adjacent mesosalpinx.

4,005,715

MATERNITY SUPPORTER

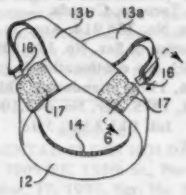
Robert G. Moore, 635 Spar Drive, Redwood City, Calif. 94065

Filed Jan. 19, 1976, Ser. No. 650,198

Int. Cl.² A41C *1/08*

U.S. Cl. 128—579 R **7 Claims**

1. A maternity supporter comprising a strip of elastic material formed to fit around and provide support for the lower half of the abdomen, the strip having elastic harness straps at either end, said straps being of sufficient length such that when the strip is placed in supporting position around the lower portion of the abdomen, the straps can be drawn behind the wearer's back, crossed over one another, and stretched over the shoulders and toward the sides of the body; and fastening means located on the harness straps so that when the



straps are stretched over the shoulders, each strap can be fastened to the opposite strap, whereby comfortable support and uplift is provided for the abdomen.

4,005,716

HAND DEVICE FOR MAKING CIGARETTES

Rudolf Messner, and Walter Weisser, both of Trossingen, Germany, assignors to Martin Brinkmann AG, Bremen, Germany

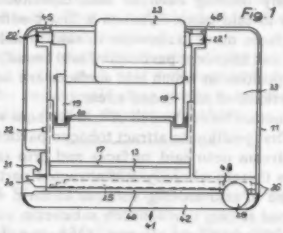
Filed Feb. 9, 1972, Ser. No. 224,741

Claims priority, application Germany, Aug. 5, 1971, 2139242

Int. Cl.² A24C *05/42*

U.S. Cl. 131—70 **4 Claims**

Fig. 1



1. A device for manually filling cigarette tubes with a plug of tobacco comprising a housing having upper and lower portions, said housing defining a chamber for receiving loose tobacco; a press bar movably mounted in said housing for movement horizontally at a right angle to the longitudinal axis of the chamber between a first position to the rear of said chamber and a second position compressing the tobacco to form a plug; a toggle lever system for actuating said press bar including a pair of parallel spaced first levers each pivotally connected at one end opposite longitudinal ends of said press bar adjacent the bottom of the lower housing portion, and a second lever arranged between said first levers and pivotally connected to the other end of the first levers and to the bottom of said lower housing portion at a distance from said press bar to permit said press bar to move between said first and second position said second lever defining a handle projecting out of said housing and positioning the connection between the first and second levers for manual actuation, substantially at a right angle to the direction of movement of said press bar; said lower housing portion including bearing boxes for pivotally supporting said handle, said upper housing portion including an interior projection for retaining said handle in said bearing boxes, a slide for ejecting the tobacco plug including a spoon in said chamber and a tube mounted in one side of said housing at the discharge end of said chamber for holding a tube to be filled with a plug of tobacco.

4,005,717

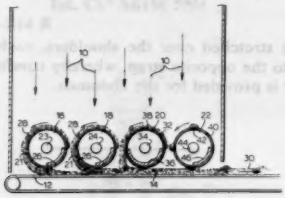
TOBACCO STREAM MANUFACTURE

Warren A. Brackmann, Cooksville, and Daniel Dilanni, Toronto, both of Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Canada

Continuation of Ser. No. 384,914, Aug. 2, 1973, abandoned, which is a continuation of Ser. No. 176,109, Aug. 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 128,412, March 26, 1971, abandoned. This application Dec. 22, 1975, Ser. No. 643,100

Int. Cl.² A24C 5/18

U.S. Cl. 131—84 R **2 Claims**



1. A process for forming a narrow tobacco filler rod having longitudinally spaced-apart zones of increased quantity of tobacco in the cross section of the filler rod to provide dense ends in cigarettes ultimately formed from the filler rod, which comprises:

showering a relatively wide broad stream of tobacco particles of narrow thickness substantially in a plane onto a plurality of continuously moving arcuate suction surfaces located in said plane across the width of said broad stream,

continuously moving each of said continuously moving surfaces in said plane between a first position in which said surfaces move transverse to said broad stream and contact and intercept particles of said broad stream and a second position in which said surfaces are out of contact with particles of said broad stream;

applying suction through each of said surfaces while located in said first position to attract tobacco particles from said broad stream onto said surfaces and grip said attracted particles thereto whereby said attracted particles assume the speed of said moving surfaces to form directly from said broad stream one tobacco substream constituted by discrete discontinuous clusters of tobacco particles and a plurality of narrow elongate tobacco substreams containing substantially the same quantity of tobacco and extending the length of the portion of each of said continuously moving surfaces located in said first position;

transporting the tobacco particles in each of said substreams on said continuously moving surfaces under the influence of suction grip by said continuous movement of said surfaces to said second position;

moving a tobacco stream-receiving and filler rodforming surface transversely to and within the plane of said broad stream adjacent said continuously moving surfaces in their second position;

releasing said suction grip on the particles of each of said plurality of substreams from the respective continuously moving surface when said respective continuously moving surface is in said second position, said particles of said plurality of substreams are moving in substantially the same direction as and adjacent to said receiving surface, and said particles of said plurality of substreams are moving at substantially the same speed as said receiving surface;

depositing said particles of said plurality of substreams immediately after said release from said moving surfaces onto said receiving surface or onto tobacco already deposited thereon while maintaining said deposited tobacco particles in substantially the same positions with respect to one another as existed in the transported plurality of substreams whereby each of the transported substreams is released from the respective continuously moving surface and is coherently positioned on the receiving surface or on tobacco already positioned thereon to provide a filler stream constituted substantially by superimposed coherent layers of tobacco in which each layer corresponds to one of said plurality of substreams;

successively releasing said suction grip on ones of said discrete cluster substreams at predetermined intervals of time;

depositing said released discrete cluster substream immediately after said release thereof substantially in coherent form onto said receiving surface or onto tobacco already deposited thereon from said plurality of continuous substreams immediately after release from the respective continuously moving surface to provide predeterminedly longitudinally spaced apart zones of increased quantity of tobacco in the cross section of the filler rod; and

removing a tobacco filler rod from said receiving surface.

4,005,718

SMOKING MATERIALS

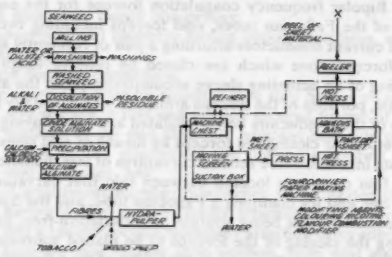
Ronald Earnest Prouse, Upminster; Anthony Alfred West, Basildon; Derek Anthony King, Ferrers, and Roger Poulson, Billericay, all of England, assignors to Carreras Rothmans Limited, England

Division of Ser. No. 385,694, Aug. 6, 1973, Pat. No. 3,951,155, which is a continuation-in-part of Ser. No. 159,741, July 6, 1971, abandoned. This application Jan. 2, 1976, Ser. No. 646,327

Claims priority, application United Kingdom, July 11, 1970, 33784/70; May 20, 1971, 16129/71

Int. Cl.² A24B 3/14

U.S. Cl. 131—140 C **27 Claims**



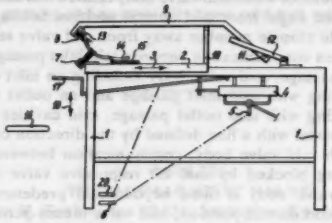
1. A method of manufacturing a smokeable material comprising a base material together with additional material which provides both a minor proportion of flavor-modifying agent and a combustion modifier, the additional material being incorporated so as to communicate selected flavor to and to allow the burning of the smokeable material suitable for use in place of smoking tobacco, in which the base material is calcium-alginate fibers, which method includes the steps of forming sheet-material from a stock by steps including the steps of mechanically working calcium-alginate fibres in the presence of water so as to disperse those fibers and to hydrate them and to provide the stock, and presenting the stock to a web-forming unit of a papermaking machine, the said additional material being incorporated into the smokeable material either prior to and/or subsequent to the said presentation of the stock to the web-forming unit.

4,005,719

METHOD OF SPREADING OUT TOBACCO LEAVES AND A DEVICE FOR SPREADING OUT TOBACCO LEAVES BY MEANS OF THIS METHOD

Ian Kjaer, Allerod, Denmark, assignor to A/S A. M. Hirschsprung & Sønner, Virum, Denmark

Filed Nov. 10, 1971, Ser. No. 197,246
Claims priority, application Denmark, Nov. 10, 1970, 5705/70
Int. Cl.² A24B *5/14*
U.S. Cl. 131—148 5 Claims



1. A device for spreading out tobacco leaves comprising a means for receiving leaves, a frame having means defining a path of advance of a leaf in a direction transverse to its stalk and point ends from the receiving means, a pair of smoothing implements movable relative to each other extending transversely of said path and arranged above and below the path in such positions as to exert a braking action on the tobacco leaf moved along said path, a platform on which said pair of smoothing implements are mounted and an operator's seat at one end of said frame, said platform being guided for reciprocating movement in said frame parallel to said path towards and away from the operator's seat.

4,005,720

SPRAY NOZZLE

Charles Machata, 3 Shore Road, Rye, N.Y. 10580

Filed Aug. 4, 1975, Ser. No. 601,624
Int. Cl.² A45D *1/00*
U.S. Cl. 132—9 8 Claims

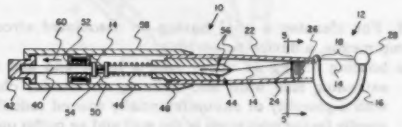
1. A spray nozzle for directing a spray of liquid at substantially the entire body of an elongated object, comprising:
a substantially rigid housing which includes a chamber for receiving liquid under pressure from a source,
and an elongated channel formed by an integral top wall, and, merging therewith,
two substantially vertically depending side walls, the side walls having bottom edges spaced from each other such that the channel width from side wall bottom edge to side wall bottom edge is greater than the transaxial width or longest diameter of the elongated object, the top and side walls being structured to encompass substantially the entire body of the elongated object and having perforations therein which communicate with the chamber and the channel and are so positioned in the top and side walls that they are capable of directing and do direct a spray of liquid therethrough at substantially the entire body including the bottom of the object when the body is axially in position within the channel wherein said object is a hair curler or permanent wave rod and the liquid spray is directed against hair wrapped therearound.

4,005,721

DENTAL FLOSS HOLDER

Michio Yasumoto, 3909 NE. 135th St., Portland, Oreg. 97230

Filed Mar. 17, 1975, Ser. No. 558,804
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 13 Claims



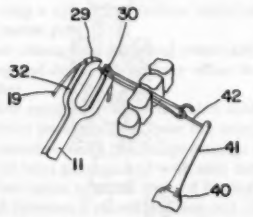
1. A dental floss holder comprising, in combination:
a. an elongate, partially hollow body adapted to hold a supply of dental floss interior thereto;
b. bifurcated tip means attached to a front end of said body for holding a tightly stretched length of said dental floss across a gap between two portions thereof;
c. an elongate shaft disposed interior to said body longitudinally relative thereto;
d. releasable clasp means disposed interior to said body and attached to the front end of said shaft for fixedly grasping a portion of dental floss; and
e. an end piece removably attached to the rear end of said body and to said shaft, said end piece including actuation means for causing said clasp means to release its grasp by transmitting motion through said shaft.

4,005,722

TOOL FOR FLOSSING TEETH UNDER A PERMANENT BRIDGE

Kenneth R. Bragg, 635 Pasco De La Playd, Redondo Beach, Calif. 90274

Filed Apr. 8, 1976, Ser. No. 674,894
Int. Cl.² A61C *15/00*
U.S. Cl. 132—92 R 18 Claims



1. A flossing tool comprising in combination a first member providing first and second spaced tips, means on the tips for supporting a strand of floss therebetween, a second member having a third tip with a wire extending therefrom, said wire having a hook, said wire being insertable between two adjacent teeth of a person whereby when the tips of the first member are placed on one side of said two teeth the wire may be inserted between said teeth from the other side thereof so as to hook the floss between the pair of tips so that upon withdrawal of the wire from between said teeth the floss is pulled between

said teeth where it may be manipulated by the two members for cleaning the adjacent surfaces of said teeth.

4,005,723

POOL CLEANING DEVICE

Jeffrey P. Rosenberg, 1270 Stillwater Drive, Miami Beach, Fla. 33141

Filed Aug. 4, 1975, Ser. No. 601,449
Int. Cl.² B08B 9/00, 3/02
U.S. Cl. 134—167 R **10 Claims**

1. For cleaning a pool having an associated circulating pump means, a device comprising:

a housing having an upper end, a lower end and axially extending side walls and defining an interior chamber with a plurality of circumferentially spaced radially outwardly facing inlet ports in the wall and an outlet opening,

means to connect the outlet to the circulating pump, a radially extending tubular arm and means rotatably connecting the arm to the housing for rotation with respect to the housing and said arm having an interior through passageway and said arm having an opening in fluid communication with a passageway through said means to connect, and means on said device for connecting a hose to flow water through said means to connect and said passageway,

a water jet assembly supported distally on the tubular arm radially spaced outwardly from the housing and defining an interior passageway with a radially inwardly facing opening to direct water flowing through the means to connect and column toward the housing and said inlet ports, and

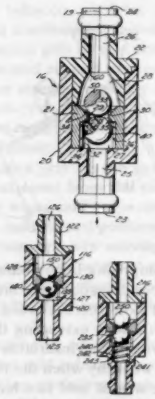
means to turn the arm.

4,005,724

TILT RESPONSIVE VALVE

Louis B. Courtot, Euclid, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed Apr. 4, 1975, Ser. No. 564,876
Int. Cl.² F16K 17/36
U.S. Cl. 137—38 **10 Claims**



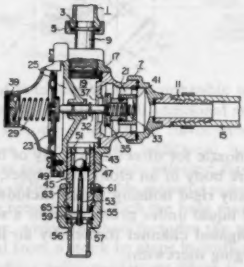
1. A tilt responsive shut-off valve comprising a valve body having an inlet passage and an outlet passage and a shut-off passage connected between said inlet and outlet passages, said shut-off passage cooperating with tilt responsive valve means constructed and arranged to block communication between said inlet passage and said outlet passage when said valve body is tilted beyond a predetermined angle in any direction about an axis from a normal vertical position, said tilt responsive valve means including a valve seat disposed between a biased shuttle closure member and a counterbiasing member, said biased shuttle closure member being biased toward a closed position against said valve seat to close communication between said inlet passage and said outlet passage, said counterbiasing member being in engagement with said biased shuttle closure member when said valve body is tilted less than said predetermined angle from said normal position holding said biased shuttle closure member away from said valve seat for normally open communication between said inlet passage and said outlet passage, said valve body including an inlet cavity communicating with said inlet passage and an outlet cavity communicating with said outlet passage, said cavities being generally coaxial with a line defined by the direction of fluid flow through said valve body, communication between said cavities being blocked by said tilt responsive valve means when said valve body is tilted beyond said predetermined angle from said normal position, said valve means permitting communication between said cavities when said valve body is in said normal position, said counterbiasing member being a ball moveable within said outlet cavity when said valve body is tilted beyond said predetermined angle from said normal position, said outlet cavity being of generally circular cross section with a diameter larger than the diameter of said counterbiasing ball, said biased shuttle closure member being a sealing ball moveable within said inlet cavity when said valve body is tilted beyond said predetermined angle from said normal position, said inlet cavity being a cylindrical bore having a fluted wall with a minimum diameter at least as large as said sealing ball, said counterbiasing ball and said sealing ball being in contact with each other and coaxial with said line defined by the direction of fluid flow through said valve body, when said valve body is tilted less than said predetermined angle from said normal position.

4,005,725

AUTOMATIC CLOSURE VALVE FOR WATER SPRINKLER

Fusamatsu Sato, Tokyo, Japan, assignor to Fujiki Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 6, 1976, Ser. No. 646,768
Claims priority, application Japan, Nov. 13, 1975, 50-154632
Int. Cl.² F16K 45/00
U.S. Cl. 137—112 **2 Claims**



1. An automatic closure valve for water sprinkler which comprises in combination; a valve casing having inlet and outlet for water supply from a water tap; a connecting means for connecting the water tap with the inlet of said valve casing; another connecting means provided at the outlet of said valve casing; a first valve chamber defined in said valve casing at the

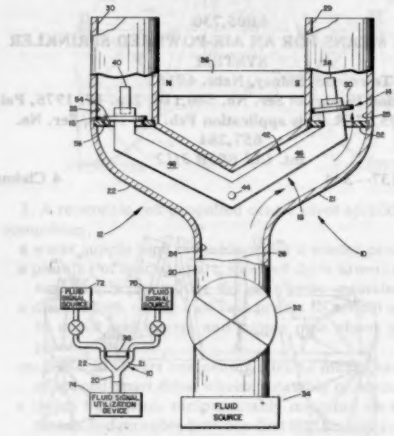
inlet side thereof; a second valve chamber defined in said valve casing at the outlet side thereof; a passage defined between said first and second valve chambers and for communicating said both valve chambers; means for closing said communicating passage in response to increase in water pressure in said second valve chamber; an opening or port provided in said valve casing to communicate said valve chamber at the inlet side with the external atmosphere; a communicating tube fitted at said opening; a ball valve provided in said communicating tube and which usually closes said opening under water pressure, and opens said opening when the pressure within said valve chamber becomes negative; an outlet tube fitted to said communicating tube in a manner movable back and forth; and a pushing rod to manually open said ball valve.

4,005,726

THERMOMAGNETIC VALVE

Herbert H. Fowler, Box 11431, Lexington, Ky. 40511

Filed June 24, 1975, Ser. No. 589,842
Int. Cl.² G05D *11/00*
U.S. Cl. 137—119 **5 Claims**



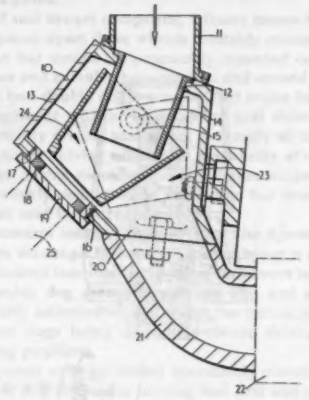
5. In a fluid flow valve unit having a fluid inlet port and a fluid outlet port, passage means providing fluid communication between said inlet and outlet ports, a valve seat disposed in said passage means between said inlet and outlet ports, a valve actuator mounted for displacement between first and second operating positions, valve closure means secured to said actuator to seat on said seat and block flow of fluid through said passage means when said actuator is displaced to its first operating position and to move away from said seat to allow flow of fluid through said passage means when said actuator is displaced to its second operating position, a magnet, magnetic means disposed in said passage means to be subject to the temperature of fluid in said passage means and having a pre-selected Curie temperature which is less than the temperature of the fluid supplied to said inlet port, said magnetic means being disposed in the magnetic field developed by said magnet to be attracted thereto when its temperature is below its Curie temperature, and said magnetic means being secured to said actuator to displace said actuator to said second operating position upon being attracted by said magnet, and means effective to cause displacement of said actuator to its first position when said magnetic means is heated by the fluid to a temperature above its Curie temperature.

4,005,727

ABRASIVE CONTROL VALVE

Alban Williams, Sale, England, assignor to Wheelabrator-Frye Inc., Hampton, N.H.

Filed Jan. 30, 1976, Ser. No. 653,646
Int. Cl.² F16K *3/00*
U.S. Cl. 137—269 **6 Claims**



1. A valve for use in controlling the flow of magnetizable abrasive from a supply to a throwing wheel via a delivery tube, the control valve comprising a casing, with inlet and outlet apertures, disposed intermediate the ends of the delivery tube, a tubular valve member pivotal about a horizontal axis in order to open or close the control valve, abrasive directing means from the inlet aperture into one end of the valve member and a magnet disposed in the casing adjacent the other end of the valve member when the valve member is in the closed position.

4,005,728

FAUCET VALVE

Ralph E. Thorp, Lafayette, Ind., assignor to Globe Valve Corporation, Delphi, Ind.

Filed Aug. 29, 1975, Ser. No. 608,523
Int. Cl.² F16K *3/10, 25/00*
U.S. Cl. 137—270 **14 Claims**

14. A faucet valve to control the volume flow of fluid, comprising:

a housing having a cylindrical hollow chamber therein and having an outlet port,

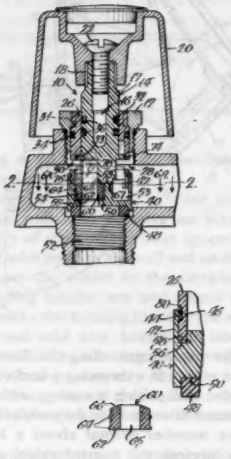
a cap member concentric with and removably attached to said housing and defining a passage offset from the axis of said chamber,

a stem member rotatably disposed within said housing and having an inlet passage offset from the axis of rotation of said stem member and a discharge passage communicating with said inlet passage and with said outlet port, said stem member upon rotation thereof having its inlet passage moved between a closed position out of registry with said passage in said cap member and an open position in registry with said passage in said cap member to vary the rate of flow of fluid through the faucet, said stem member having a flat bottom surface,

a resilient grommet seal disposed in said passage in said cap member and defining a passage, and

sealing means between said stem member and said housing, the diameter of said passage through said cap member being greater than the diameter of said passage through said grommet, said grommet being continuously urged against and in sliding sealing engagement with said bottom sur-

face of said stem member, and said grommet having a bottom surface against which hydraulic pressure of said



liquid acts to urge said grommet into a floating seal with said cap member and said stem member.

4,005,729

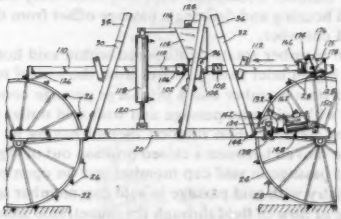
BRAKE MEANS FOR AN AIR-POWERED SPRINKLER SYSTEM

Loren R. Townsend, Sidney, Nebr. 69162

Continuation-in-part of Ser. No. 540,114, Jan. 10, 1975, Pat. No. 3,952,768. This application Feb. 11, 1976, Ser. No. 657,283

Int. Cl.² B05B 3/12

U.S. Cl. 137—344 **4 Claims**



1. A self-propelled sprinkling apparatus comprising,

a water supply pipe moveable about a central pivot point,

a plurality of spaced-apart, wheeled drive towers supporting said supply pipe above the area to be sprinkled,

a fluid-operated drive means on each of said towers to propel said towers and said supply pipe about said central pivot point,

means for supplying fluid under pressure to said drive means,

control means on said towers for controlling the operation of said drive means so that said towers will be selectively driven to maintain said supply pipe in an aligned condition as said pipe is moved about said central pivot point,

each of said drive towers comprising at least a pair of wheels, at least one of said wheels having spaced-apart drive lugs provided thereon,

a brake member rotatably mounted on at least one of said towers adjacent the said one wheel, said brake member having means thereon which is in operative engagement with said drive lugs so that said brake member will be rotated by said drive lugs on said one wheel when said one wheel is rotating,

a fluid cylinder mounted on said one tower and having a cylinder rod extending therefrom which is operatively connected to said brake member so that rotation of said brake member causes said cylinder rod to extend and retract relative to said fluid cylinder,

said fluid cylinder normally preventing the rotation of said brake member thereby preventing the rotation of said one wheel,

and brake release means operatively connected to said fluid cylinder to permit said cylinder rod to freely extend and retract when said drive means is driving said one wheel at a predetermined rate of rotation.

4,005,730

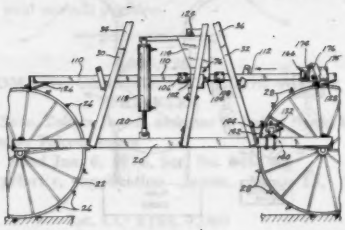
BRAKE MEANS FOR AN AIR-POWERED SPRINKLER SYSTEM

Loren R. Townsend, Sidney, Nebr. 69162

Continuation-in-part of Ser. No. 540,114, Jan. 10, 1975, Pat. No. 3,952,768. This application Feb. 11, 1976, Ser. No. 657,284

Int. Cl.² B05B 3/12

U.S. Cl. 137—344 **4 Claims**



1. A self-propelled sprinkling apparatus comprising,

a water supply pipe movable about a central pivot point,

a plurality of spaced-apart, wheeled drive towers supporting said supply pipe above the area to be sprinkled,

a fluid operated drive means on each of said towers to propel said towers and said supply pipe about said central pivot point,

means for supplying fluid under pressure to said drive means,

control means on said towers for controlling the operation of said drive means so that said towers will be selectively driven to maintain said supply pipe in an aligned condition as said pipe is moved about said central pivot point,

each of said drive towers comprising at least a pair of wheels, at least one of said wheels having spaced-apart drive lugs provided thereon,

a brake member rotatably mounted on at least one of said towers adjacent the said one wheel, said brake member having a plurality of fingers extending therefrom for engagement with said drive lugs so that said brake member will be rotated by said drive lugs on said one wheel when said one wheel is rotating,

a fluid pump mounted on said one tower and having a shaft rotatably extending therefrom which is operatively connected to said brake member so that rotation of said brake member causes said shaft to rotate,

said fluid pump normally preventing the rotation of said brake member thereby preventing the rotation of said one wheel,

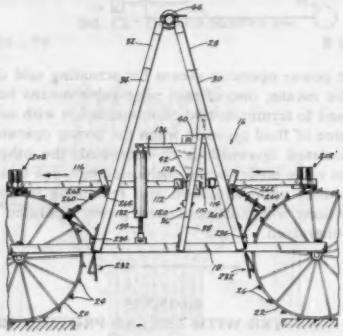
and brake release means operatively connected to said fluid pump to permit said shaft to freelyrotate when said one wheel is being driven at a predetermined rate of rotation.

4,005,731

REVERSIBLE SELF-PROPELLED CENTER PIVOT SPRINKLER SYSTEM

Loren R. Townsend, Sidney, Nebr. 69162

Filed Mar. 5, 1976, Ser. No. 664,184
Int. Cl.² B05B 3/12
U.S. Cl. 137—344 **7 Claims**



1. A reversible self-propelled center pivot sprinkler system, comprising,

a water supply pipe movable about a center pivot point,

a plurality of spaced-apart, wheeled drive towers supporting said supply pipe above the area to be sprinkled,

a drive means on each of said towers to propel said towers to move said towers and supply pipe about said center pivot point,

each of said towers comprising a frame means having a pair of spaced-apart drive wheels rotatably mounted thereon,

a trojan bar means reciprocatably mounted on said frame means and movable between first and second positions, at least one double dog means on said trojan bar means for engagement with at least one of said drive wheels for selectively driving said wheel forwardly at times and for selectively driving said wheel rearwardly at other times,

a power means mounted on said frame means and being operatively connected to said trojan bar means to reciprocate said trojan bar means,

and a control means for controlling the operation of said power means so that the associated tower is propelled at the desired rate relative to the other towers in the system,

at least one double ratchet arm brake means movably mounted on said frame means for selective engagement with one of said drive wheels for preventing the tower from rolling rearwardly when said trojan bar means is driving said tower forwardly and for preventing the tower from rolling forwardly when said trojan bar means is driving said tower rearwardly,

said brake means comprising an elongated member pivotally mounted on said tower and having oppositely disposed ratchets at the opposite ends thereof, and means connected to said elongated member for selectively pivoting said elongated member to move one of said ratchets into engagement with said one wheel while moving the other ratchet out of engagement with said one wheel.

7. A reversible self-propelled center pivot sprinkler system, comprising,

a water supply pipe movable about a center pivot point,

a plurality of spaced-apart, wheeled drive towers supporting said supply pipe above the area to be sprinkled,

a drive means on each of said towers to propel said towers to move said towers and supply pipe about said center pivot point,

each of said towers comprising a frame means having a pair of spaced-apart drive wheels rotatably mounted thereon,

a trojan bar means reciprocatably mounted on said frame means and movable between first and second positions, at least one double dog means on said trojan bar means for engagement with at least one of said drive wheels for selectively driving said wheel forwardly at times and for selectively driving said wheel rearwardly at other times,

a power means mounted on said frame means and being operatively connected to said trojan bar means to reciprocate said trojan bar means,

and a control means for controlling the operation of said power means so that the associated tower is propelled at the desired rate relative to the other towers in the system,

said double dog means comprising first and second dogs movably mounted on said trojan bar means, said first and second dogs being movable between driving and non-driving positions,

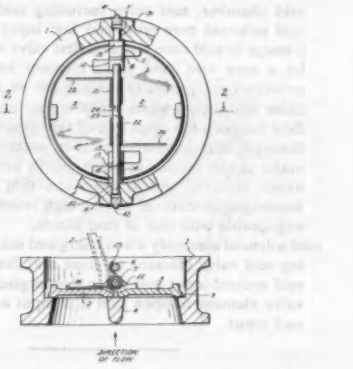
and a power cylinder means operatively connected to said double dog means for moving said first and second dogs between said driving and non-driving positions.

4,005,732

FLAPPER VALVE WITH INDEPENDENT SPRING ACTION

Spencer P. Buckner, Houston, Tex., assignor to TRW Inc., Cleveland, Ohio

Filed Aug. 25, 1975, Ser. No. 607,339
Int. Cl.² F16K 15/03
U.S. Cl. 137—512.1 **6 Claims**

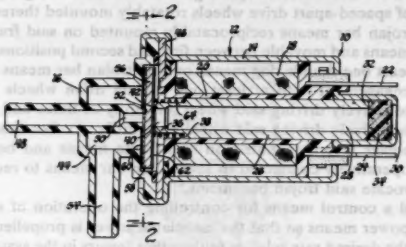


1. An improved valve of the type having a body with a fluid flow conduit therethrough, a valve seat surrounding said flow conduit, valve members for sealing said fluid flow conduit, stationary shaft means extending diametrically across said flow conduit for pivotally supporting said valve members within said body, and hinges for supporting said valve members on said shaft means, wherein the improvement comprises at least one separate helical torsion spring encircling a portion of said shaft means for each valve member for biasing said valve member toward its closed position, one leg of which is in contact with said valve member and the other leg of which is in contact with a stationary stop means.

4,005,733
PRESSURE CONTROL VALVE

John W. Riddel, Fenton, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 17, 1975, Ser. No. 632,399
Int. Cl.² F16K 31/06
U.S. Cl. 137—625.4 3 Claims



1. A control valve assembly especially for controlling low gaseous fluid pressure differential flows and pressures with a valve opening and closing in a variable duty cycle at variable frequencies, said assembly comprising:

a housing having a generally circular valve chamber therein and first and second differential gaseous fluid pressure inputs oppositely disposed therein and defining first and second valve seats in aligned spaced relation, one of said inputs extending into said valve chamber and forming therewith an annular chamber section and a gaseous fluid pressure output communicating with said annular chamber section;

a solenoid assembly including a core and a coil and an annular field plate secured to said housing, said field plate extending into said chamber and surrounding said first input;

and a valve including a valve element received in said chamber between said valve seats and movable to engage and close either one of said inputs while opening the other to said chamber, said valve including said valve seats and said solenoid core with said first input being through a passage in said core and said first valve seat being formed by a core end, said valve element being of sandwich construction, generally rectangular so as to engage and close said inputs while providing no obstruction to fluid flow between the open one of said inputs and said output through said annular chamber section, and having a major center section of magnetically attractive low remanence material and at least one thin outer section of nonmagnetic material having high resistance to wear and engageable with one of said inputs;

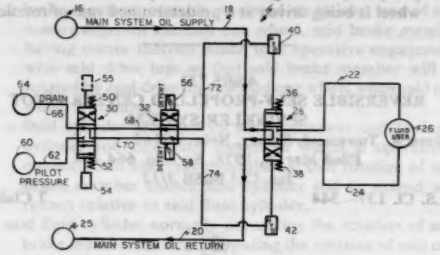
said solenoid assembly when energized magnetically attracting said valve element to close said first input and open said second input and when deenergized permitting said valve element to open said first input and close said second input.

4,005,734
HYDRAULIC DIRECTIONAL MEMORY UNIT

Philip A. Kubik, 6809 Spruce Drive, Birmingham, Mich. 48010

Filed Aug. 18, 1975, Ser. No. 605,715
Int. Cl.² F15B 21/08
U.S. Cl. 137—625.63 1 Claim

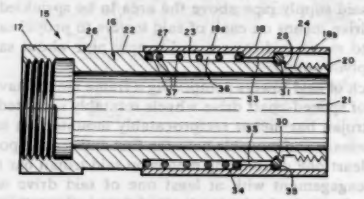
1. A directional control valve for selectively communicating a fluid source to a fluid user, said directional control valve comprising first valve means shiftable from a first position communicating said fluid source to said fluid user to a second position wherein said fluid source and fluid user are not in fluid communication, said first valve means having pressure responsive means operable upon being communicated to a second source of fluid pressure for communicating said fluid source to said fluid user and being operable to terminate said communication when said pressure responsive means is not in communication with said second source of fluid pressure; and second and third pilot valve means operable upon actuation to communicate said pressure responsive means to said second source of fluid pressure, first power operated means for actuating said second pilot valve means; second power operated means for actuating said third pilot valve means; one of said pilot valve means being positioned to terminate said communication with said second source of fluid pressure when the power operated means associated therewith is de-energized; the other of said pilot valve means being positioned between two operable positions upon actuation and remaining in one of said positions when its associated power operated means is de-energized.



4,005,735
ADAPTER WITH THREAD PROTECTOR

Eddie Kakuo Miyamoto, 1815 S. Bascom Ave., Campbell, Calif. 95008

Filed Dec. 1, 1975, Ser. No. 636,846
Int. Cl.² B65D 59/04; F16L 57/00
U.S. Cl. 138—96 R 2 Claims



1. A coupling device for connecting the internally threaded end of a nozzel to a hose, comprising

a tubular body connectable at one end to the hose and having a smooth cylindrical bore with a diameter about equal to the hose bore diameter extending substantially the full length of the body, said body having external threads at the other end for connection to said nozzel,

a sleeve mounted on said body for limited relative axial movement between a first position with one end thereof radially spaced from and fully covering said external threads and a second position fully exposing said threads,

said body having first and second axially adjacent external cylindrical portions extending from said external threads for substantially the remainder of the length of the body,

said first portion having a diameter approximately the same as the inside diameter of said sleeve and greater than the diameter of said second portion, said first and second portions being joined by radial shoulder means,

said sleeve having a radially inwardly projecting ridge defined by axially spaced shoulders and having cylindrical

inner surfaces with the same diameter extending from opposite ends of the sleeve to opposite sides of said ridge, said body having an annular groove adjacent to the inner end of said external threads, a snap ring mounted in said groove and projecting radially outwardly therefrom for engagement with one of said shoulders when said sleeve is in said first position, and

a helical compression spring coaxially disposed about said second body portion within said sleeve and having opposite ends abutting the other of said sleeve shoulders and said shoulder means, respectively.

4,005,736

ECCENTRIC MECHANISM FOR DRIVING A PLURALITY OF HEDDLE CARRYING FRAMES

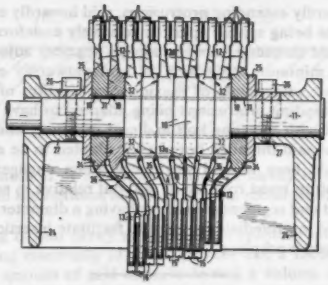
Erwin Pfarrwaller, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed July 2, 1975, Ser. No. 592,675

Claims priority, application Switzerland, July 29, 1974, 10371/74

Int. Cl.² D03D *5/02*

U.S. Cl. 139—79 **8 Claims**



1. An eccentric mechanism for driving a plurality of heddle carrying frames in a weaving machine, said mechanism comprising

a plurality of rotatable eccentrics;

a plurality of cam follower levers, each said lever being positioned relative to a respective eccentric to be moved thereby;

a fixedly mounted spindle;

a plurality of deflecting levers rotatably mounted on said spindle, each said deflecting lever being pivotally connected to a respective cam follower lever;

a plurality of bearing elements, each said element having an annular bushing portion and a flange portion disposed between a respective pair of adjacent deflecting levers; and

means connected to each said deflecting lever to raise and lower a heddle carrying frame.

4,005,737

WINDOW SCREEN ASSEMBLY TOOL

Robert W. Nason, 2766 E. 112th St., Lynwood, Calif. 90262

Filed Jan. 2, 1976, Ser. No. 646,381

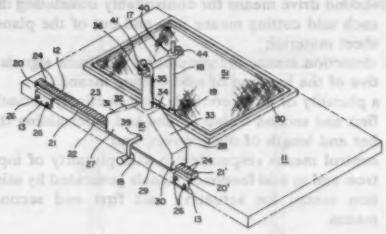
Int. Cl.² B21F *33/02*

U.S. Cl. 140—109 **1 Claim**

1. A window or door screen assembly tool for the assembly of screens to windows or doors, the tool comprising, in combination:

a gear train with mounting brackets for securement of said gear train to the side of a bench or table top, a drive gear secured within a housing by means of a handle affixing said drive gear within the housing and said handle protruding outwardly of said housing, a round shaft securely affixed to the center of the top of said housing and provided with a round hole at the top of said shaft, vertical and horizontal adjustable shafts for positioning of a pressure roller outwardly and downwardly from said housing for proper alignment of said pressure roller to a window or door frame and so as to apply proper pressure on said pressure roller for the assembly of tubing for attachment of a screen to a screen frame; and

said housing consisting of side walls with a flat elongated



bottom surface, said side walls being spaced equally distant to each other in the same plane by means of two vertical and perpendicular side walls, two side walls at an oblique angle to cover said drive gear, a short top wall being parallel to the bottom surface with a round shaft being securely affixed to the center of said top surface, and with said shaft being provided with a round hole near its top and with a through threaded hole through its circumference for assembly of a threaded bolt therethrough.

4,005,738

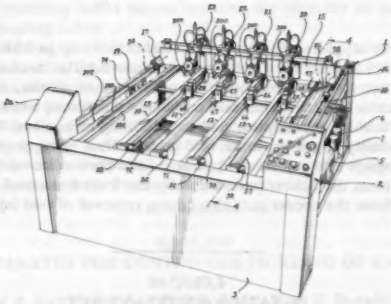
AUTOMATIC DADOING MACHINE

Delbert D. Strange, and Ronald M. Hunts, both of San Diego, Calif., assignors to Manufacturing Approaches & Total Concepts Inc., San Diego, Calif.

Filed July 31, 1975, Ser. No. 600,726

Int. Cl.² B27F *1/02*; B26D *3/06*

U.S. Cl. 144—136 R **12 Claims**



1. A system for automatically cutting grooves in sheet material, said system comprising in combination:

a. a plurality of parallel rails for supporting the sheet material;

b. first clamp means for engaging one of a pair of opposed edges of the sheet material, said first clamp means including bias means for maintaining the sheet material adjacent said plurality of rails;

c. second clamp means for engaging another of the pair of opposed edges of the sheet material, said second clamp means including bias means for urging the sheet material toward said first clamp means and for maintaining the sheet material adjacent said plurality of rails;

d. cutting means for forming each of the grooves, said cut-

ting means having a rotatable bit in general vertical alignment with one of said plurality of rails and selectively positioned within the plane of the sheet material and translatable into and out of the plane of the sheet material;

e. translation means for positioning the bit of each of said cutting means within the plane of the sheet material;

f. first drive means for controllably actuating said translation means;

g. second drive means for controllably translating the bit of each said cutting means into and out of the plane of the sheet material;

h. detection means for generating feedback signals indicative of the location of said cutting means;

i. a plurality of input controls for selectively actuating said first and second clamp means and determining the number and length of the grooves; and

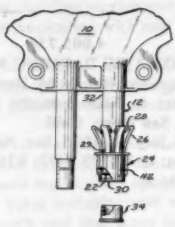
j. control means responsive to said plurality of input controls and to said feedback signals generated by said detection means for actuating said first and second drive means.

4,005,739

SUPPLEMENTAL MEDICATION INDICATION CAP FOR SOLUTION CONTAINERS AND THE LIKE

David Allen Winchell, Twin Lakes, Wis., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Oct. 20, 1975, Ser. No. 624,195
Int. Cl.² B65D *33/16*
U.S. Cl. 150—8 9 Claims



1. A supplemental medication indication cap in which said cap is installed on a solution container tubular access port, said access port carrying at its outer end an elastic, needle-piercable injection site, said cap being positioned to fit about said tubular access port, said cap defining at one end thereof a plurality of gripper arms, said gripper arms being positioned to engage said injection site upon attempted removal of said cap from the access port, whereby the forced removal of the cap from the access port also causes removal of said injection site.

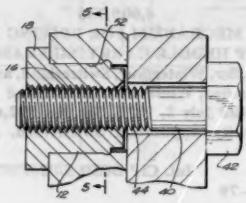
4,005,740

ROTATION RESISTANT NUT

Joseph P. Villo, deceased, late of Rydal, Pa.; by Jean Villo, co-executrix, Rydal; by The Fidelity Bank, co-executor, Philadelphia, both of Pa., and Charles A. Wilson, Williamstown, N.J., assignors to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Aug. 24, 1972, Ser. No. 283,345
Int. Cl.² F16B *39/22*
U.S. Cl. 151—41.73 5 Claims

1. A fastener assembly comprising a first workpiece having a smooth surface bore extending therethrough and an insert-type rotation resistant nut received in said bore, said nut comprising a nut body having a threaded bore extending therethrough, the exterior surface of said nut body including an intermediate segment having a generally smooth, continuous surface and an end segment, said intermediate segment formed with a plurality of generally lobular radially outwardly extending protrusions extending throughout substantially the entire axial length of said intermediate segment, each of said protrusions being arcuate throughout substantially its entire circumferential extent and including a pair of points of minimum radial projection and a point of maximum radial projection, said intermediate segment having an interference fit with said bore in said workpiece such that said workpiece elastically deforms said threaded bore forming a plurality of radially inwardly extending protrusions, each of said inwardly extending protrusions including a point of maximum radial projection radially adjacent said points of maximum projection of



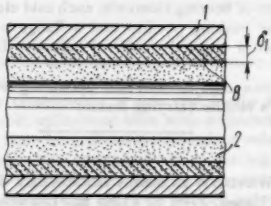
said outwardly extending protrusions, said inwardly extending protrusions being spaced apart by relatively undeformed portions of said threaded bore including a segment adjacent said points of minimum projection of said outwardly extending protrusions, said points of maximum projection of said inwardly extending protrusions being adapted to have an interference fit with a mating bolt and said relatively undeformed portions of said threaded bore being adapted to be expanded against said bore in said workpiece when engaged with a mating bolt to resist rotation of said nut relative to said workpiece, said end segment of said nut having a diameter less than that of said intermediate segment to facilitate insertion of said nut into said workpiece.

4,005,741

METHOD FOR THE FABRICATION OF TUBE PRODUCTS

Elmar Juganovich Juganson, prospekt Lenina, 40, kv. 32; Isaak Yakovlevich Chernyavsky, ulitsa Vorovskogo, 41, kv. 10; Vladimir Yakovlevich Ivantsov, prospekt Lenina, 62, kv. 2; Jury Ivanovich Blinov, ulitsa Tsvillinga, 31, kv. 43; Vladimir Petrovich Ustyantsev, ulitsa Vagnera, 71, kv. 112, and Igor Alexeevich Klestov, ulitsa Soni Krivoi, 37, kv. 2, all of Chelyabinsk, U.S.S.R.

Filed Mar. 5, 1975, Ser. No. 555,616
Int. Cl.² B22D *23/00*
U.S. Cl. 164—54 13 Claims



1. A method for the fabrication of twin-layer tube products, comprising: centrifugally spinning a hollow cylindrical part in a horizontal plane; introducing a Thermit mixture to constitute the material of the tube product, and incorporating at least one metal oxide and a reducer into the bore of the cylindrical part during said spinning step; igniting and burning the mixture, thereby to obtain a liquid melt; again centrifugally spinning the hollow centrifugal part until the now liquid mixture is separated into a metal layer and a corundum layer, uniformly distributed over the inside surface of the cylindrical

part; and crystallizing the materials so that a twin-layer tube product is obtained.

4,005,742

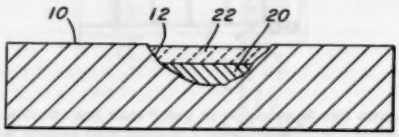
METHOD OF RESTORING INGOT MOLD STOOLS AND CLOSED-BOTTOM INGOT MOLD

Robert H. Kachik, Washington Township, Westmoreland County; Samuel J. Manganello, Penn Hills Township, Allegheny County, and Arthur J. Pignocco, Franklin Township, Westmoreland County, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 517,991, Oct. 25, 1974, abandoned, which is a division of Ser. No. 332,870, Feb. 15, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,793

Int. Cl.² B23K *23/00*; B22D *19/10*

U.S. Cl. 164—54 **19 Claims**



1. A method of repairing an erosion cavity in ingot mold stools and the bottoms of closed-bottom metal molds comprising:

placing in said cavity an exothermic reaction mixture consisting essentially of a fuel powder and a metallic oxide, the amount of said mixture having a volume no greater than one and a half times the volume of the cavity;

igniting said mixture to form a superheated melt comprising a metal phase and a slag phase, such that said melt is contained entirely within said cavity,

maintaining said melt in said cavity for a time sufficient to allow said melt to separate so that said metal phase is at the bottom and the slag phase thereover,

permitting said melt to solidify with the metal phase securely bonded to the bottom of the cavity and said slag phase securely attached to said metal phase, and permitting said slag phase to remain in said erosion cavity during subsequent use of said mold or mold stool to thereby provide extra protection from erosion and extend the life of the repaired stool or mold.

12. A method of repairing an erosion cavity in the bottom of a closed-bottom ingot mold comprising:

placing in the bottom of said mold an exothermic reaction mixture consisting essentially of a fuel powder and a metallic oxide, the amount of said mixture having a volume greater than 1.5 times the cavity volume but less than 5 times the cavity volume,

igniting said mixture to form a superheated melt comprising a metal phase and a slag phase,

maintaining said melt at the bottom of said mold for a time sufficient to allow said melt to separate into a metal phase and a slag phase, said metal phase separating to the bottom and being entirely contained within said cavity, while said slag phase covers the entire bottom of the mold,

permitting said melt to solidify with the metal phase securely bonded to the bottom of the cavity and said slag phase securely attached to the metal phase to provide a slag surface over the entire bottom of the mold, and permitting said slag phase to remain in on said mold bottom during subsequent use of said mold to thereby provide extra protection from erosion and extend the life of the repaired mold.

4,005,743

APPARATUS FOR THE CONTINUOUS CASTING OF METALS ESPECIALLY STEEL, AND METHOD OF CONTINUOUSLY CASTING METALS

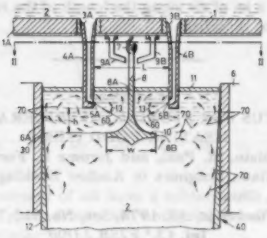
Tetsuo Ueda, Kurashiki, Japan, assignor to Kawasaki Steel Corporation, Kobe, Japan

Filed Oct. 28, 1975, Ser. No. 626,558

Claims priority, application Japan, Nov. 1, 1974, 49-126328

Int. Cl.² B22D *11/10*, *11/16*

U.S. Cl. 164—82 **15 Claims**



1. An apparatus for the continuous casting of molten metal, especially steel, comprising a continuous casting mold, a multiplicity of pouring tubes each having at least one outlet opening inclined at a predetermined angle with respect to a horizontal for delivering molten metal into a molten metal bath contained within the continuous casting mold, and means arranged between the pouring tubes to prevent collision of the molten metal delivered through the outlet openings of the pouring tubes and for controlling the flow of the molten metal in the continuous casting mold.

9. A method of casting molten metal into a continuous casting mold, especially for casting steel, comprising the steps of:

a. providing a continuous casting mold;

b. providing a plurality of spaced pouring tubes for the infeed of molten metal into the continuous casting mold, each pouring tube having at least one outlet opening for the infeed of the molten metal into the continuous casting mold;

c. providing baffle means between the plurality of spaced pouring tubes;

d. feeding molten metal through the pouring tubes and delivering the molten metal in the form of casting jets into the continuous casting mold through the outlet openings of the pouring tubes; and

e. directing the outflowing metal casting jets so as to impact against the baffle means in order to prevent collision of the outflowing metal casting jets and to control the flow of metal in the continuous casting mold.

4,005,744

APPARATUS FOR CONTINUOUS PICKLING OF CAST ROD

Daniel B. Cofer; Enrique Calixta Chia; John E. Burnitt, and Theodor W. Kaltenberg, all of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

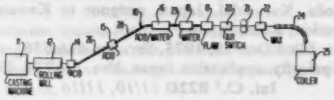
Division of Ser. No. 446,842, Feb. 28, 1974, which is a division of Ser. No. 109,421, Jan. 25, 1971, Pat. No. 3,806,366, which is a division of Ser. No. 808,976, March 20, 1969, Pat. No. 3,623,532. This application Jan. 10, 1975, Ser. No. 540,022

Int. Cl.² B22D *11/124*

U.S. Cl. 164—270 **12 Claims**

1. In apparatus for continuously forming copper rod or the like including casting means for forming a copper bar, rolling means for lengthening and reducing the cross-sectional area of the bar to form rod, coiling means for coiling the rod, means for quench-pickling the rod as the rod passes from the rolling means to the coiling means, said quench-pickling means including for impinging the rod with a flow of high velocity

pickling agent; means for causing the pickling agent to flow in counterflow relation to the movement of the rod, and means



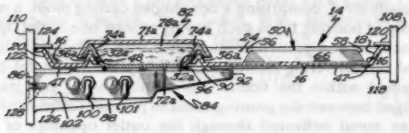
for directing a jet of air along the length of the rod to wipe the pickling agent therefrom.

4,005,745

APPARATUS FOR STORING, REFRIGERATING AND HEATING FOOD ITEMS

Albert E. Colato, St. Paul, and Jerome L. Formo, Roseville, both of Minn., assignors to Anchor Hocking Corporation, Lancaster, Ohio

Filed Sept. 30, 1974, Ser. No. 510,746
Int. Cl.² F25B *13/00*
U.S. Cl. 165—2 **12 Claims**



1. Apparatus for storing, refrigerating and heating food items in serving containers comprising in combination:
   a. serving containers containing food items
   b. a tray supporting the serving containers,
   c. at least one opening extending through the tray surface,
   d. means supporting and positioning one of said serving containers containing a food item to be heated within said opening,
   e. a cover on said serving container for said food item to be heated,
   f. a rack for said tray,
   g. said rack having means for mounting said tray thereon,
   h. means contacting the bottom of said serving container containing food to be heated for heating said container when the tray is mounted in the rack, said heating means being so positioned that it supports the serving container vertically above and out of contact with said container supporting and positioning means,
   i. means for refrigerating said rack to refrigerate all said food items in said serving containers on said tray, and
   j. means for actuating said heating means to heat said food item in said refrigerated serving container which is in contact with said heating means while other food items in serving containers on the tray remain refrigerated.

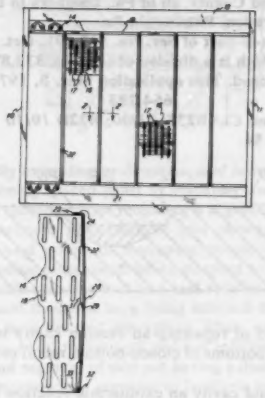
3. Apparatus for storing, refrigerating and heating food items in serving containers comprising in combination:
   a. serving containers containing food items,
   b. a tray supporting the serving containers,
   c. at least one opening extending through the tray surface,
   d. means supporting and positioning one of said serving containers containing a food item to be heated within said opening,
   e. a rack for said tray,
   f. said rack having means for mounting said tray thereupon,
   g. heating means carried by said rack in alignment with the tray opening and being in contact with the bottom of said serving container containing food to be heated when the tray is mounted on the rack, said heating means being so positioned that it supports said serving container vertically above and out of contact with said container supporting and positioning means,
   h. means for refrigerating said rack to refrigerate all said food items in said serving containers on said tray, and
   i. means for actuating said heating means to heat said food item in said refrigerated serving container which is in contact with said heating means while other food items in serving containers on the tray remain refrigerated.

4,005,746

SECTIONAL HEAT EXCHANGER

Fred M. Young, Racine, Wis., assignor to Young Radiator Company, Racine, Wis.

Filed Aug. 22, 1975, Ser. No. 606,887
Int. Cl.² F28F *7/00*
U.S. Cl. 165—69 **5 Claims**



1. In a sectional heat exchanger having a plurality of separate heat exchanger units disposed in a frame which has opposite frame sides for receiving said units in side-by-side relation, and a plate extending between two of said units, the improvement comprising said plate being yieldingly compressible and affixed along one edge of said plate to one of said two units and with the edge of said plate opposite said one edge being free of attachment to said one unit, said yieldingly compressible plate being of a spring material and compressible between the two said units and having a central portion yieldingly urging toward the other of said two units for yieldingly urging said two units away from each other and respectively toward said frame sides and thereby snugly retain said units in said frame and lessen vibration of said units in said frame.

4,005,747

MULTI-FLOW, MULTI-PATH HEAT EXCHANGER FOR PUMP-MECHANICAL SEAL ASSEMBLY

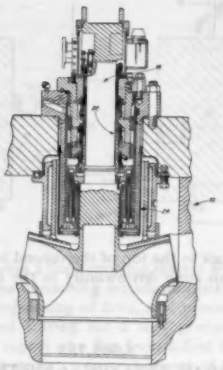
Rowland E. Ball, Long Beach, Calif., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed June 27, 1975, Ser. No. 590,884
Int. Cl.² F16J *15/44*
U.S. Cl. 165—134 **5 Claims**

1. A heat exchanger for a pump-mechanical seal assembly which comprises:
   at least a pair of generally cylindrical housing members surrounding the driving shaft from the motor to the pump impeller;
   each housing member having a plurality of concentric partitions which define with one another a plurality of concentric cylindrical openings communicating with one another, and also a plurality of circumferential grooves and axial slots, which grooves and slots communicate with one another;
   a cooling fluid inlet and a cooling fluid outlet each connected to the outermost circumferential groove;

said outermost circumferential groove being separated into two segments, one segment being connected to said inlet and the other segment being connected to said outlet;

means defining a path for the flow of hot fluid from said pump into said cylindrical openings in a zig-zag path for discharge from said exchanger, and



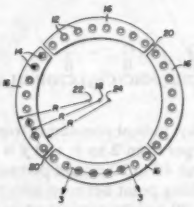
said grooves and slots being so constructed and arranged that cooling fluid flows in a path substantially counter to said hot fluid through one segment of the outermost groove, into the outermost slots communicating therewith and thence into interior slots communicating with said outermost slots to the other segment of said outermost groove and then to said outlet.

4,005,748

ANNULAR HEAT EXCHANGER FINS

Robert D. MacDonald, Grand Blanc, Mich., and Robert K. Rose, Burnt Hills, N.Y., assignors to Champion Home Builders Co., Dryden, Mich.

Filed Mar. 14, 1975, Ser. No. 558,593
Int. Cl.² F28D *11/00*
U.S. Cl. 165—151 **4 Claims**



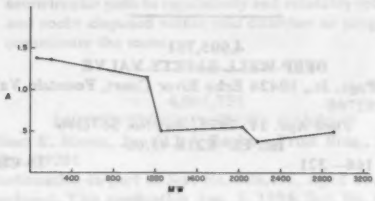
1. In a heat exchanger of the type characterized by a plurality of fluid-carrying tubes arranged in a laterally-spaced, generally cylindrical fashion, and a plurality of generally annular fins spaced longitudinally along said tubes, each annular fin having a plurality of angularly spaced tube-receiving holes arranged in a generally circular pattern to receive each of said tubes, the improved fin construction wherein each of said annular fins comprises a plurality of circumferentially and coplanarly arranged segments having inner and outer edges of identical but radially spaced contour.

4,005,749

OIL RECOVERY BY SURFACTANT WATERFLOODING

Silvia C. Birk, Fort Worth; Samuel H. Collins, Grand Prairie, and Peggy M. Wilson, Dallas, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 11, 1975, Ser. No. 630,832
Int. Cl.² E21B *43/22*
U.S. Cl. 166—273 **5 Claims**



1. In the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems, the method comprising:

a. injecting into said reservoir via said injection system an aqueous pretreatment slug containing a water-soluble polyalkylene oxide sacrificial agent having a molecular weight of at least 1200 selected from the group consisting of polyethylene glycols, polypropylene glycols, interpolymers of polypropylene glycols and polyethylene glycols, and mixtures thereof,

b. thereafter introducing into said reservoir via said injection system an aqueous surfactant slug containing a surfactant having a lower molecular weight than the molecular weight of said polyalkylene oxide,

c. introducing into said reservoir via said injection system an aqueous flooding medium to displace reservoir oil to said production system, and

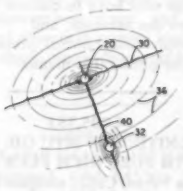
d. recovering oil from said production system.

4,005,750

METHOD FOR SELECTIVELY ORIENTING INDUCED FRACTURES IN SUBTERRANEAN EARTH FORMATIONS

Lowell Z. Shuck, Morgantown, W. Va., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 1, 1975, Ser. No. 592,482
Int. Cl.² E21B *43/26*
U.S. Cl. 166—308 **6 Claims**



1. A method of providing a subterranean earth formation with a hydraulically-induced fracture disposed in a plane substantially orthogonal to the plane of the maximum tectonic compressive stress field, consisting of pressurizing fluid in the first of the first and second wellbores penetrating said earth formation at locations spaced apart from one another along a plane disposed at an angle generally perpendicular to the plane of the maximum tectonic compressive stress field for sufficiently stressing the earth formation surrounding said first wellbore to provide a maximum compressive stress field in said earth formation encompassing said second wellbore and projecting along a plane orthogonal to the plane of the maxi-

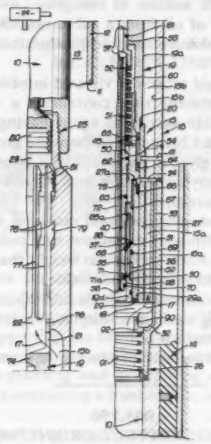
mum tectonic stress field and extending between said spaced-apart wellbores, and then pressurizing fluid in the second wellbore while maintaining said maximum compressive stress field provided by the pressurization of the fluid in the first wellbore for inducing a fracture in the earth formation adjacent to said second wellbore with said fracture extending toward said first wellbore in a direction substantially parallel to the plane of the maximum compressive stress field projecting therebetween.

4,005,751

DEEP WELL SAFETY VALVE

John S. Page, Jr., 10424 Echo River Court, Fountain Valley, Calif. 92708

Filed Apr. 11, 1975, Ser. No. 567,376
Int. Cl.² E21B *43/00*
U.S. Cl. 166—321 **19 Claims**



19. In a well valve,

a. a housing connectible in a well tubing string,

b. a main valve movable in the housing between open and closed positions, the housing and main valve providing a vertically open straight bore in main valve open position,

c. a control pressure responsive main valve actuator to displace the main valve between said positions,

d. a control pressure responsive pilot valve carried by the housing outside said bore to control application of control pressure to the actuator, and

e. means to supply said control pressure for control as aforesaid by the pilot valve means.

4,005,752

METHOD OF IGNITING IN SITU OIL SHALE RETORT WITH FUEL RICH FLUE GAS

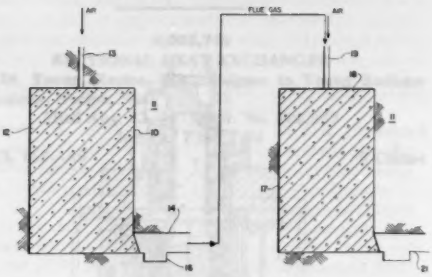
Chang Yul Cha, La Verne, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation of Ser. No. 492,253, July 26, 1974, abandoned.
This application Oct. 16, 1975, Ser. No. 622,653
Int. Cl.² E21B *43/24*
U.S. Cl. 166—260 **13 Claims**

1. A process for igniting an in situ oil shale retort comprising the steps of:

generating a combustible flue gas in a first in situ retort containing a bed of hot spent oil particles by introducing air at the top of the first retort, and withdrawing flue gas from the bottom of the first retort;

burning the combustible flue gas at a top entrance of a second in situ retort containing a bed of unretorted oil shale particles and passing the combustion products downwardly through the bed for heating a portion of the top of the second bed of oil shale particles to the ignition temperature of oil shale particles in the top portion of the bed for establishing a combustion zone at the top of the second bed; and



introducing air to the top of the second bed for moving the combustion zone downwardly in the ignited second retort.

4,005,753

METHOD OF TREATING A SUBTERRANEAN FORMATION WITH A POLYMERIC DIVERTING AGENT

John W. Scheffel, Fullerton, and Paul W. Fischer, Whittier, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Division of Ser. No. 475,511, June 3, 1974, Pat. No. 3,954,629.
This application Mar. 4, 1976, Ser. No. 663,989
Int. Cl.² C09K *7/02*; E21B *33/138*, *43/26*
U.S. Cl. 166—283 **8 Claims**

7. A method of completing a well bore drilled into a subterranean formation comprising circulating a completion fluid from the surface to the drilling zone in said formation during the drilling operation and returning to the surface at least a portion of said completion fluid, said completion fluid comprising a pumpable carrier medium having suspended therein particles having a mean diameter of from about ⅛ inch to about 1 micron of a homogeneous solid mixture comprising (1) about 5 to 25 weight percent of a polymer selected from the group consisting of polyethylene having a melt index of less than 100 grams in 10 minutes, ethylene-vinyl acetate copolymer containing about 15 to 30 weight percent of vinyl acetate having a melt index of from about 1 to about 500 grams per 10 minutes, and admixtures of said polymers; (2) about 8 to 50 weight percent of a polyamide having a melting point between about 400° F. and 460° F. characterized by the formula:

$$RCNH(CH_2)_xNHC(CH_2)_xCNH(CH_2)_xNHCR$$

wherein R is an alkyl radical containing from 15 to 18 carbon atoms, x is an integer from 2 to 4, and y is an integer from 4 to 10; and (3) about 40 to 50 weight percent of a polyterpene resin having a melting point between about 230° F. and 275° F. or about 60 to 70 weight percent of an aliphatic diamide having a melting point between about 280° F. and 300° F. characterized by the formula:

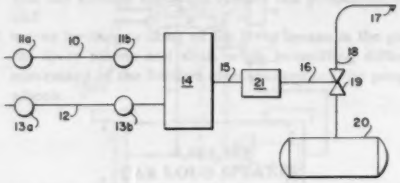
$$R'CNHR''NHCR'$$

wherein R′ is an alkyl radical containing from 15 to 18 carbon atoms and R″ is an alkylene radical containing from 2 to 4 carbon atoms.

4,005,754
PROCESS FOR THE AUTOMATIC REPORTING AND EXTINGUISHING OF FIRES

Gerhard Linden, von-Werth-Str: 5-7, 5 Cologne 1; Dierk Lay, Im Thurnerfeld 60, 5 Cologne 80, and Karl Tiedtke, Zanderstrasse 37, 5203 Much, all of Germany

Filed Mar. 6, 1975, Ser. No. 555,987
Int. Cl.² A62C 37/04
U.S. Cl. 169—46 9 Claims



1. A process having a fire reporting system which controls a locally fixed fire extinguishing installation for the automatic reporting and extinguishing of fires, said process comprising

A. receiving and storing for a first predetermined time period a first report of a fire from a first fire reporter,

B. receiving and storing a second report of the fire from a second fire reporter within the first predetermined time period,

C. operating the locally fixed fire extinguishing installation to release a first quantity of extinguishing agent in response to steps A and B,

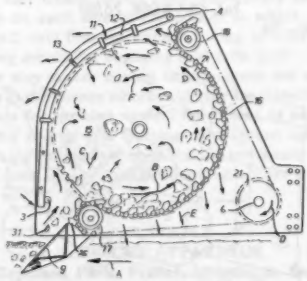
D. after a second predetermined time period, determining whether the fire is extinguished, and

E. repeating steps C and D until the fire is extinguished.

4,005,755
MACHINE FOR ROCK REMOVAL AND SOIL CULTIVATION

Even A. Bakke, Skrenten 5, Gjovik, Norway (2800), and Kaare W. N. Berg, c/o Jostein Berge, Ottestad, Norway (2312)

Filed Dec. 9, 1974, Ser. No. 530,950
Claims priority, application Norway, Dec. 14, 1973, 734786
Int. Cl.² A01B 17/00, 43/00
U.S. Cl. 172—32 12 Claims



1. A soil cultivating machine comprising,

horizontally disposed comminuting and classifying means formed of a pair of spaced vertically disposed side wall members,

a displaceable foraminous chain belt disposed between said side wall members adapted to move in an upwardly directed generally semicircular path and,

an arcuately shaped foraminous grid cooperatively associated with said chain belt and side wall members to form a generally cylindrically shaped foraminous comminuting chamber,

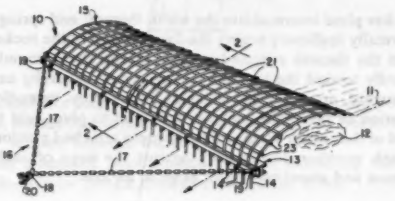
means positioned to be displaced through and below the surface of the soil to be cultivated for introducing soil and rocks contained therein into the lower portion of said chamber intermediate the dependent end of said grid and the dependent terminus of said semicircular path of said displaceable chain belt, and

means for displacing said chain belt upwardly along said semicircular path to repetitively and rotatably recycle soil and rocks disposed within said chamber to progressively comminute the same.

4,005,756
LIGHTWEIGHT PASTURE HARROW

William E. Morse, Jr., 612 A Bankers Trust Bldg., Jackson, Miss. 39201

Continuation-in-part of Ser. No. 388,495, April 15, 1973, abandoned. This application Aug. 5, 1975, Ser. No. 602,063
Int. Cl.² A01B 19/02
U.S. Cl. 172—643 36 Claims



10. A lightweight harrow adapted to be pulled over the ground for breaking up piles of manure and the like in a pasture, and for light field cultivation comprising a rigid elongated front crossbar, means for connecting said front crossbar to a tractor or other draft means for towing said harrow, a row of transversely spaced front harrow teeth depending form said crossbar, a wire mesh framework secured to said front crossbar along the length thereof and extending rearwardly from said front crossbar, said wire mesh framework including a plurality of transversely spaced resilient longitudinal wire members with trailing ends for engaging the ground and providing a row of transversely spaced rear harrow teeth, and a plurality of longitudinally spaced transverse wire members intersecting said longitudinal wire members with means securing said longitudinal and transverse wire members together where they intersect, said wire mesh framework normally maintaining a predetermined shape, and being resilient to yeild to encountered objects in normal usage and to return to its predetermined shape upon disengagement with said encountered objects.

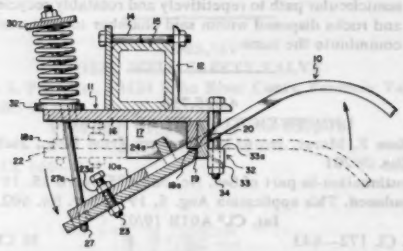
4,005,757
CLAMP SHANK DEVICE

Mitchell J. Hess, Plymouth, Utah 84330

Filed Mar. 10, 1975, Ser. No. 556,676
Int. Cl.² A01B 61/04
U.S. Cl. 172—710 10 Claims

1. A clamp shank device comprising a shank member rectangular in cross-section and having a substantially horizontal forward portion and a downwardly-extending rear portion; a supporting frame having a top wall and a transverse rear wall depending from said top wall across the width thereof, said rear wall being stepped upwardly from its bottom along its length on the portion thereof facing the interior of the frame to define a forwardly and downwardly facing, included angle, and being deeply notched upwardly from its bottom intermediate its length to receive said forward portion of the shank member and to accommodate upward movement thereof; a

rocker plate positioned within the supporting frame below said top wall thereof, the rearward end of said plate being a surface inclined downwardly and forwardly from the upper edge to the lower edge thereof, said upper edge forming a pivot edge across the width of the plate which abuts and pivots against the portion of said rear wall defining vertex of said included angle; means rigidly holding said forward portion of the shank member flatwise against the upper surface of the



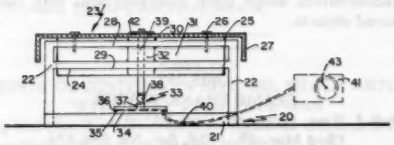
rocker plate intermediate the width thereof; and spring means normally resiliently urging the forward end of the rocker plate and the thereto attached portion of the shank member upwardly toward the top wall of said frame, whereby excessive rearward pressure against said downwardly extending rear portion of the shank member will tend to pivot said forward end of the rocker plate and the thereto attached portion of the shank member downwardly against the urge of said spring means and about said pivot edge as an axis.

4,005,758

WEIGH SCALES

Berthuld Thomas Johnson, 1551-97th St., North Battleford, Saskatchewan, Canada

Filed Apr. 4, 1975, Ser. No. 564,867
Int. Cl.² G01G *3/08*
U.S. Cl. 177—229 **7 Claims**



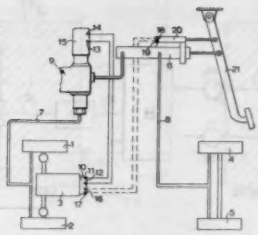
1. A weigh scale comprising in combination a base frame component, a load receiving frame component within said base frame, a torsion bar situated on each side of at least one pair of opposite sides of said scale and being fixedly and operatively connected between said base frame component and said load receiving frame component, to support said load receiving frame component relative to said base frame component, and load indicating means operatively connected between said components, each of said torsion bars being secured intermediate the ends thereof to one of said components and by each end thereof to adjacent the ends of the other of said components.

4,005,759

SOLENOID-OPERATED VALVE

Glyn Phillip Reginald Farr, Leek Wootton, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Sept. 19, 1975, Ser. No. 615,127
Claims priority, application United Kingdom, Oct. 11, 1974, 44114/74
Int. Cl.² B60T *13/00*; B60K *1/00*
U.S. Cl. 180—65 R **6 Claims**



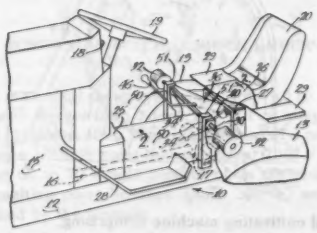
1. A solenoid-operated hydraulic brake pressure regulating valve assembly for use in an hydraulic braking system of an electrically driven vehicle comprising housing means having means defining an inlet for connection to an hydraulic master cylinder and means defining an outlet for connection to brakes on wheels driven by an electric motor adapted to provide regenerative braking, a solenoid-operated valve, and a pressure-responsive valve, said solenoid-operated valve and said pressure-responsive valve being located in said housing in parallel connection between said inlet and said outlet, means closing said solenoid-operated valve when regenerative braking is in operation and opening it at all other times to provide communication between said inlet and said outlet, said pressure-responsive valve incorporating pressure responsive means constructed and arranged to cause said pressure-responsive valve to remain open until a predetermined value of the pressure at said inlet is reached at which pressure the pressure at said outlet is sufficient to take up braking clearances whereafter said pressure-responsive valve closes to prevent said brakes being applied hydraulically thereby holding off a pressure equivalent to the torque generated whilst regenerative braking is in operation.

4,005,760

TRACTION CONTROL DEVICE

Ralph R. Gunderson, 8212 S. Homan, Chicago, Ill. 60652

Filed May 14, 1973, Ser. No. 360,300
Int. Cl.² B60K *26/00*
U.S. Cl. 180—74 **10 Claims**



1. In a vehicle having a chassis with propelling wheels connected by a differential, a traction control device for connecting the propelling wheels directly when the differential permits relative motion between the wheels, comprising,

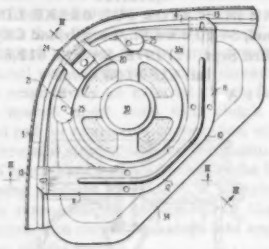
a. a rotatable shaft having friction elements fixed thereon spaced apart axially to engage the propelling wheels of the vehicle,

b. bearing means rotatably supporting the shaft at spaced positions between the friction elements thereon,
c. lever means pivotally mounted on the chassis and supporting the bearing means, said lever means including a generally triangular wobble plate pivotally mounted adjacent one corner thereof and having the shaft bearing means supported thereon adjacent the two other corners,
d. means normally urging the lever means in a direction to move the friction elements out of contact with the propelling wheels,
e. means connected to the lever means to move the shaft and the friction elements toward the propelling wheels, and
f. means limiting twisting of the lever means in the plane of the lever means and shaft while permitting differential movement of the friction elements toward the propelling wheels.

4,005,761
CAR LOUD SPEAKER

Kintaro Okamoto, Hachioji; Hirokatu Kudo, Wako; Etsuro Kadoiri, and Hiroshi Soma, both of Tokyo, all of Japan, assignors to Pioneer Electronic Corporation and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,545
Claims priority, application Japan, Nov. 26, 1974, 49-143245
Int. Cl.² H05K *10/00*
U.S. Cl. 181—141 **4 Claims**



1. A loud speaker assembly or use in a car, said car comprising a car body having a ceiling and having upwardly directed rails adjacent the ceiling at a body corner, said assembly comprising:
a loud speaker,
a first stay means having ends respectively secured to said rails on each side of the corner at which said rails are joined, said first stay means having at both ends thereof fitting means for engaging said rails, and
corner stay means having fitting means for engaging said rails at the corner where said rails are joined, and a spring means for pressing against the ceiling of said car at said corner to bias said fitting means against said rail corner from a point line above said rails, and means for attaching said loud speaker to said first and corner stay means.

4,005,762
RESCUE APPARATUS

Gerard Zephinie, Paris, France, assignor to Societe Soberal S.A., Luxembourg, Luxembourg

Division of Ser. No. 477,071, June 6, 1974, Pat. No. 3,973,644.
This application July 2, 1975, Ser. No. 592,625
Claims priority, application France, June 5, 1974, 74.20410
Int. Cl.² A62B *1/20*
U.S. Cl. 182—48 **3 Claims**

1. An apparatus for slowing the rate of descent of a falling body being evacuated from an elevated point to a point therebelow, comprising

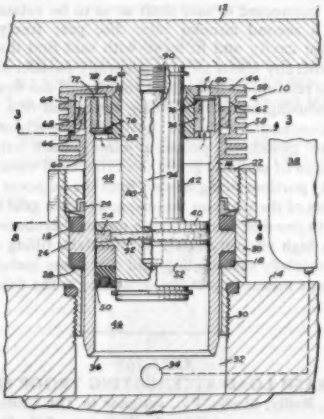
1. a flexible tubular device having two open ends, one end substantially at the level of the elevated point and the other end substantially at the level of the point therebelow, the tubular device extending substantially vertically from the elevated point to the point therebelow and being elastic in the transverse and circumferential but substantially inextensible on the longitudinal direction thereof,

2. means for fixing the respective open ends at said points,
a. the tubular device being maintained under longitudinal tension between the two fixed ends, and
3. an elongated pretensioned element extending through the tubular device from one end to the other.

4,005,763
LUBRICATING MEANS FOR GAS-OPERATED CYLINDERS

Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed Mar. 19, 1975, Ser. No. 559,660
Int. Cl.² F16N *1/00*
U.S. Cl. 184—24 **30 Claims**



1. In combination a cylinder, a piston movable axially in the cylinder and dividing the cylinder into a working chamber and an idle chamber which vary inversely in size in accordance with movement of the piston axially in the cylinder, means communicating said working chamber with a source of pressurized gas and permitting said gas to flow into and out of said working chamber, passageway means establishing communication between the surrounding atmosphere exteriorly of said

cylinder and said idle chamber and permitting the flow of air into and out of said idle chamber, and air permeable means in at least one section of said passageway means impregnated with a lubricant, said air permeable means being disposed so that air flowing through said one section of said passageway means into said idle chamber is directed into intimate contact with said lubricant to entrain the lubricant in said air, whereby said piston and the internal walls of said idle chamber are lubricated by the lubricant entrained in the air flowing into said idle chamber.

4,005,764

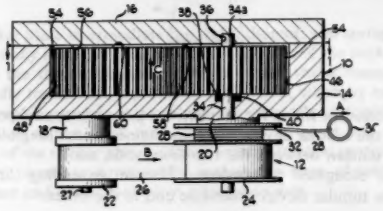
GOVERNOR MEANS FOR TOY AND GAME MOTORS OR THE LIKE

Rouben T. Terzian, Chicago; Eckehard Friederich, Niles, and Howard J. Morrison, Deerfield, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Continuation of Ser. No. 292,137, Sept. 25, 1972, abandoned. This application Aug. 19, 1974, Ser. No. 498,577

Int. Cl.² F03G *1/00*

U.S. Cl. 185—37 **6 Claims**



1. Governor means for use in toys, games and the like having a frame structure, for operative connection to a motor means of the toy or game to control the operating speed of the motor means, comprising: a housing immovably fixedly positioned on the frame structure and having a closed interior cavity, a driven shaft rotatably mounted on said housing and extending from said motor means through said housing into said cavity, a first circular disc gear disposed in said cavity and drivingly connected to said shaft so as to be rotatably driven thereby, a second circular idler disc gear freely rotatable within said cavity and in mesh with said first disc gear for rotation thereby about an axis generally parallel and in fixed positional relation to the axis of rotation of the first disc gear and the housing, said cavity being comprised of a cylindrical portion concentric with and surrounding each of said disc gears, the cylindrical portions joining each other in the meshed area of said disc gears, the cylindrical walls of each of said cavity portions being spaced from the adjacent peripheral extremities of the teeth on the respective disc gear a sufficient distance to provide liquid passage means therebetween, and a relatively high viscosity liquid substantially filling said cavity and substantially surrounding said disc gears including filling said passage means to provide resistance to the driving of said disc gears.

4,005,765

CRASH LOAD ATTENUATING TROOP SEAT

Mason J. Reilly, Media, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 354,425, April 25, 1973, Pat. No. 3,868,143. This application Feb. 24, 1975, Ser. No. 552,001

Int. Cl.² F16D *63/00*

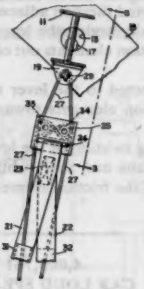
U.S. Cl. 188—1 C **1 Claim**

1. A shock absorber of the metal deforming type for use in conjunction with a strap-supported troop seat to absorb sudden impact comprising:

a hollow housing having two opposed openings thereto;

first and second rods spatially separated and laterally positioned between said openings and secured at their ends to the interior walls of said housing;

a shock absorbing wire bent back upon itself near its midpoint and formed to connect to the aircraft defining first



and second wire halves, said first and second wire halves each weaving from the midpoint into one of said openings around the distal sides of respective ones of said rods, crossing between said rods, weaving around the distal sides of the respective others of said rods and out the other of said openings.

4,005,766

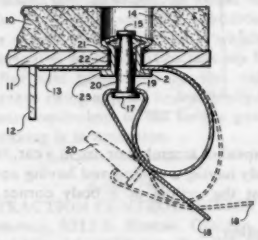
WEAR INDICATOR FOR BRAKE LINING

Richard Kennel, 34-10 43rd St., Long Island City, N.Y. 11101

Filed Sept. 12, 1975, Ser. No. 612,828

Int. Cl.² F16D *66/02*

U.S. Cl. 188—1 A **10 Claims**



1. A device for indicating the wear of a brake lining secured on a brake shoe within a brake drum wherein the brake shoe includes at least one opening, comprising:

a stud having a central aperture for securement into the opening of said brake shoe;

said stud being constructed of a resilient material including a flange integrally formed in one end with a diameter larger than the opening of said brake shoe to prevent said stud from passing into said brake shoe and a cone-shaped tip formed at the opposite end so that said stud can be compressibly inserted into the opening to permit said cone-shaped end to expand against the brake shoe to prevent the withdrawal of the stud;

a rivet pin slidably disposed in the aperture of said stud, and having an enlarged head on one end disposed a predetermined depth below the wearing surface of the brake lining, said pin head being larger in diameter than the aperture of said stud;

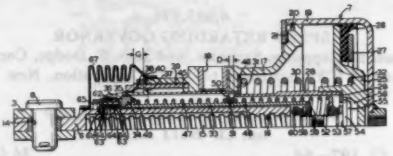
spring indicating means coupled to the opposite end of said rivet pin and secured to said stud for biasing said pin with a withdrawal force with respect to said stud, said spring means including a free end disposed within the brake

drum so that when the surface level of the brake lining wears down to the level of said rivet head and the rivet head is worn off, said spring means will pull the opposite end of said pin through the central aperture of said stud so as to permit the free end of said spring means to contact the brake drum and produce an audible signal.

4,005,767
SLACK ADJUSTER MOUNTED INSIDE A BRAKE CYLINDER

Luciano Farello, Turin, Italy, assignor to WABCO Westinghouse GmbH, Turin, Italy

Filed Mar. 4, 1976, Ser. No. 663,676
Claims priority, application Italy, Mar. 18, 1975, 67682/75
Int. Cl.³ F16D 65/66
U.S. Cl. 188—203 7 Claims



1. A slack adjuster mechanism for a brake cylinder having a piston provided with an internal clutch face and a stop surface spaced apart from said clutch face on the piston, and a hollow piston rod that has therein internal non-self-locking screw threads, said slack adjuster mechanism comprising:

a. an external non-self-locking screw-threaded rod having thereon respectively an external clutch face and a stop surface spaced apart from said clutch face on said threaded rod for respective cooperation with the internal clutch face and stop surface on the piston,

b. a pair of spaced-apart stops carried by the brake cylinder,

c. a stopping element carried by a stopping means and movable responsive to movement of the piston from engagement with one of said stops into engagement with the other of said stops,

d. seating means carried by said stopping means,

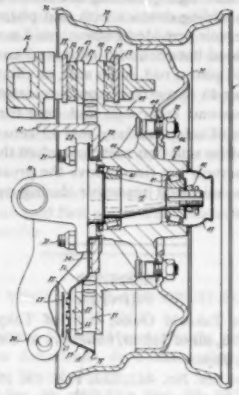
e. a pair of resilient biasing means interposed respectively between said stopping element and said seating means and between said externally threaded rod and said seating means enabling axial displacement of said stopping element by said piston upon movement thereof in said one direction, one of said resilient biasing means being compressed responsive to movement in said one direction of said piston subsequent to engagement of said stopping element with one of said pair of stops, and the other of said resilient biasing means being effective upon movement of said piston in a direction opposite said one direction, subsequent to movement in said one direction greater than the distance between said spaced-apart stops, to cause rotation of said externally threaded rod relative to said hollow internally threaded piston rod to increase the effective length of said piston rod an amount equal to said movement in said one direction of said piston subsequent to engagement of said stopping means with said one stop, and

f. resisting means connecting said stopping element and said hollow piston rod enabling movement of said piston rod by said piston in said one direction relative to said stopping element subsequent to engagement of said stopping element with said one stop and effective to maintain said stopping element and said piston rod stationary upon movement of said piston in said direction opposite said one direction until said rotation of said externally threaded rod relative to said piston rod increases the effective length of said piston rod said amount.

4,005,768
DUST SHIELD FOR DISC BRAKE

Terry L. Bubnash, Dearborn Heights, and John C. Haldane, Jr., Northville, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 28, 1975, Ser. No. 636,183
Int. Cl.³ F16D 65/847
U.S. Cl. 188—218 A 10 Claims



6. A disc brake having a brake rotor with a pair of annular braking surfaces;

a brake caliper straddling said rotor;

a support member supporting said caliper;

a shield connected to said support member having an arcuate portion adjacent one of said braking surfaces;

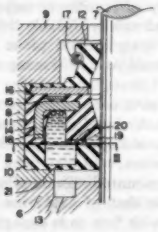
said arcuate portion of said shield having a plurality of ventilation holes;

said arcuate portion having an axially extending lip positioned about the periphery of each of said holes.

4,005,769
SEALING ARRANGEMENT FOR A SHOCK ABSORBER HAVING AN ANNULAR RESERVOIR

Hidekuni Itoh, Kasugai, Japan, assignor to Showa Manufacturing Co., Ltd., Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,223
Claims priority, application Japan, Nov. 7, 1974, 49-127502
Int. Cl.³ F16F 9/36
U.S. Cl. 188—315 4 Claims



1. A sealing arrangement for a shock absorber comprising an inner cylinder having first and second ends and defining an inner working chamber in which a piston for generating a damping force is slidably fitted, an outer cylinder having first and second ends and spaced coaxially from said inner cylinder to define a first annular oil and high pressure gas reservoir

between said inner and outer cylinders, said inner cylinder having at least one hole therethrough near the second end thereof to allow fluid communication between said inner chamber and said first reservoir, a piston rod secured to said piston and extending outwardly of the first end of said inner and outer cylinders, said second end of said inner and outer cylinders being closed, a rod guide secured to the first end of said inner and outer cylinders and in sliding contact with said piston rod, an auxiliary sene and main seal arranged above said rod guide and tightly sealing the first end of said outer cylinder and in sliding contact with said piston rod, a second annular oil reservoir provided between said main and auxiliary seal, a gap defined between said main and auxiliary seals and enclosed by said piston rod, main seal, auxiliary seal, and said second reservoir to allow fluid communication between said rod and said second reservoir, and cuts formed through a bottom surface of said auxiliary seal to return oil from said second reservoir to said first reservoir when the oil pressure in said second reservoir has risen above the pressure of said high pressure gas in said first reservoir during operation of said shock absorber.

4,005,770
PRINTER

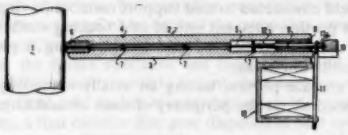
Mitsuo Hirose; Takashi Oono, both of Tokyo, and Makoto Ueno, Kodaira, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 442,222, Feb. 13, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,781

Claims priority, application Japan, Feb. 19, 1973, 48-19876; Feb. 19, 1973, 48-21303[U]; May 17, 1973, 48-58095[U]; May 17, 1973, 48-58096[U]

Int. Cl.² B41J *3/10*

U.S. Cl. 197—1 R **1 Claim**



1. A dot printer having a platen and a type head and wherein:

a. said type head is flat and arranged perpendicularly to a row of character-printing positions; and

b. said type head is shiftable along said platen in a direction parallel to said row to print dots in a pattern on a record layer interposed between said platen and said type head, said type head comprising:

1. a pair of head plates lying generally in a plane perpendicular to said platen and transversely of said row,

2. a fan array of rectilinear impacting wires extending between and axially slidable through said head plates, said array lying in said plane perpendicular to said platen and said row, said array converging toward said platen,

3. operating pins each having one end respectively secured on each of said wires at ends thereof remote from said platen, said operating pins having free ends remote from said wires, said pins lying in a fan array,

4. solenoids mounted on said plates in a fan array corresponding to that of said pins and having respective armatures with free ends engaging the free ends of said pins for displacing same and the wires rectilinearly upon energization of the respective solenoids,

5. stop means on said plates for engagement with said wires,

6. said head plates being provided at ends immediately proximal to said platen with front bearings formed with recesses for slidably supporting said wires at their ends proximal to said platen,

7. a plurality of support members extending across said array and a plurality of tubular intermediate members mounted on said support members and slidably traversed by the respective wires.

8. a plurality of wire blocks each associated with a respective one of said wires, each of said wire blocks having a base plate,

9. a bracket mounted on said base plate and a bearing carried by said bracket and slidably receiving a respective pin of a respective wire, each solenoid being secured to the respective base, said blocks being detachably mounted on said head plates, said solenoids being staggered in a zigzag arrangement on said head plates, and

respective fingers pivotally mounted at one end on the respective base plate and extending with clearance through the respective head plate to engage a respective pin, each of said fingers being attractable by one of said solenoids and forming said armatures.

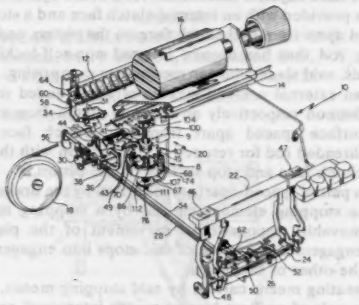
4,005,771
SPEED RETARDING GOVERNOR

Samuel D. Cappotto, Syracuse, and John E. Dodge, Cortland, both of N.Y., assignors to SCM Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,469

Int. Cl.² B41J *19/02*

U.S. Cl. 197—64 **34 Claims**



1. A carriage retarding governor for typewriters that includes a traversable carriage, the movement of which is regulated by an escapement mechanism that includes a rotatable toothed escapement drive wheel that is coupled to a carriage rack by an integral shaft and pinion gear, the carriage retarding governor comprising:

a rotatable housing having an arcuate wall;

a pivotless segment disposed within said housing;

means on said housing for selectively rendering said housing stationary; and

means for engaging and urging said segment to rotate under the influence of the movement of the carriage and be centrifugally displaced and wedged against said stationary housing thereby retarding the traverse of the carriage.

4,005,772
AUTOMATIC JUSTIFYING TYPEWRITER HAVING PITCH CHANGING AND LINE SPACING APPARATUS

John B. Kieffer, Riverton, Wyo.; Gregory G. Vogel, Lewisville, Tex., and Raymond B. Larsen, Riverton, Wyo., assignors to Harris Corporation, Cleveland, Ohio

Continuation of Ser. No. 296,934, Oct. 12, 1972, abandoned. This application June 13, 1975, Ser. No. 586,758

Int. Cl.³ B41J *19/58*

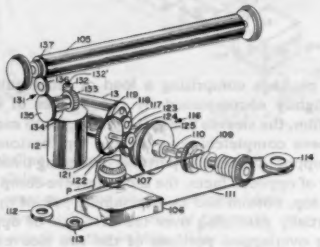
U.S. Cl. 197—84 R **12 Claims**

1. In an automatic justifying typewriter including a type-

writer printer having character printing means capable of printing characters of differing horizontal widths, printer control means for actuating said character printing means to impress selected characters on a print-out medium, a rotatable platen for vertical positioning of the print-out medium, and means for originating electrical signals corresponding to the character to be printed, the improvement comprising:

incremental drive means for effecting incremental horizontal movement between said character printing means and said print-out medium,

a data source connected to receive said character corresponding electrical signals for selectively and successively producing coded printing control signals each corresponding to a particular character to be printed and



coded spacing control signals having a count corresponding to a preselected horizontal space for each respective character to be printed, said printer control means including means responsive to each said printing control signal to actuate said character printing means to print the corresponding character on said print-out medium,

means including counter means for storing said count of said coded spacing control signals, and

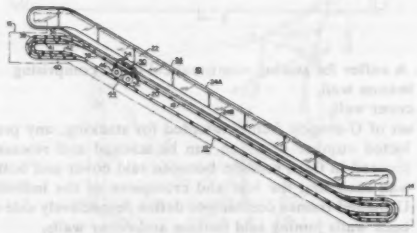
means responsive to said spacing control signals in said storing means for causing said incremental drive means to effect relative horizontal motion between said character printing means and said print-out sheet in a number of increments corresponding to the said count of said stored spacing control signals.

4,005,773

TRANSPORTATION DEVICE HAVING MOVABLE HANDRAILS

Joseph R. Bouille, Gettysburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1974, Ser. No. 531,429
Int. Cl.² B66B 9/14
U.S. Cl. 198—335 **4 Claims**



1. Transportation apparatus comprising:

an endless handrail having first and second major opposed surfaces,

a supporting structure for guiding said handrail in a closed loop,

and driving means for moving said handrail about the closed loop defined by said supporting structure,

said driving means including driven shaft members, traction rollers fixed to said driven shaft members, and pressure rollers,

said traction and pressure rollers being cooperatively positioned against the first and second surfaces of said handrail,

at least certain of said traction rollers including tire and hub portions formed of first and second elastomeric materials, respectively,

said first and second elastomeric materials being bonded together without a sharp line of demarcation, wherein the interface between the tire and hub portion is a zone which includes a mixture of said first and second elastomeric materials,

said first elastomeric material being disposed in driving contact with said handrail,

said first elastomeric material being selected to provide a dynamic coefficient of friction with said handrail of at least 0.6,

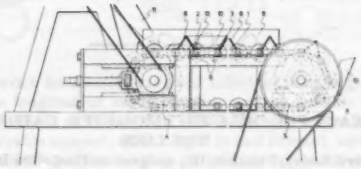
said second elastomeric material being a relatively harder material than said first elastomeric material, to provide a support therefor.

4,005,774

PEDUNCLED VEGETABLE AND FRUIT POSITIONING DEVICE

Jose Maria Casanova Valero, Murcia, Spain, assignor to Compania Hispano Americana de Construcciones Conserveras S.A. Chaconsa, Murcia, Spain

Continuation of Ser. No. 427,853, Dec. 26, 1973, abandoned. This application July 1, 1975, Ser. No. 592,319
Int. Cl.² B65G 47/24
U.S. Cl. 198—384 **5 Claims**



1. A device for positioning and transporting peduncled fruits and vegetables, said device comprising:

a frame;

an endless conveyor mounted for movement along said frame;

said conveyor including a plurality of pairs of rollers arranged axially parallel to each other and transverse to the direction of movement of said conveyor;

each said pair of rollers comprising a first type roller and a second type roller, at least one of said first and second type rollers having therein means for receiving and retaining the pedicle of a peduncled fruit or vegetable, said means comprising at least one peripheral canal;

means operatively connected to said first and second type rollers for rotating said first and second type rollers in the same direction at the same speed, said rotating means comprising a rack fixedly mounted on said frame, and pinions fixed to said rollers and in meshing engagement with said rack;

said conveyor having attached thereto and positioned between adjacent pairs of rollers generally upwardly extending dihedral walls;

lateral plates positioned at opposite lateral sides of said conveyor and extending in said direction of movement thereof; and

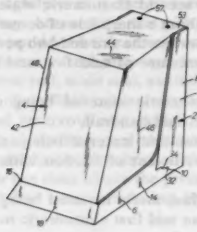
means extending radially from said at least one roller of each said pair of rollers for moving said peduncled fruit or vegetable such that said pedicle thereof is positioned in said at least one peripheral canal and such that said pedicle faces downwardly.

4,005,775

DISPLAY CASE FOR USE WITH A MERCHANDISE DISPLAY RACK

Louis John Crossien, Grafton, Wis., assignor to Frank Mayer & Associates, Inc., Grafton, Wis.

Filed Feb. 24, 1976, Ser. No. 660,867
Int. Cl.² B65D *5/50, 1/34*
U.S. Cl. 206—45.18 **10 Claims**



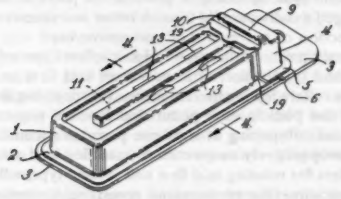
1. A wristwatch display case comprising: a molded one piece base and a removable cover, said one piece base including a bottom portion, a back portion, a mounting cuff attached to one of said portions and for supporting a wristwatch thereon, a hinge integrally connected to said bottom portion and to said back portion and hingedly connecting said portions for movement between an open position wherein said portions are substantially coplanar, whereby a wristwatch supported on said mounting cuff is readily accessible, and an angular display position wherein said portions are substantially transverse, and means on said base and cover enabling said base and cover to be releaseably secured together.

4,005,776

PACKAGE FOR ORAL THERMOMETER, CATHETER OR THE LIKE

Leonard Seeley, Palatine, Ill., assignor to Plastofilm Industries, Inc., Wheaton, Ill.

Filed May 2, 1975, Ser. No. 573,851
Int. Cl.² B65D *85/38, 85/08, 65/16, 5/50*
U.S. Cl. 206—306 **10 Claims**



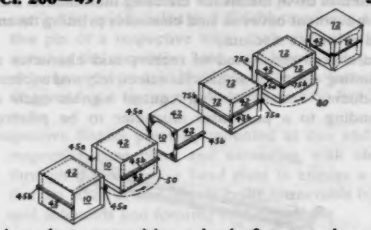
1. In a package for tubular articles including a thermoformed plastic bubble, means for receiving and retaining a long, thin article comprising a trough formed integral with the bubble and pairs of keepers spaced along the length of said trough for holding the article in said trough, each said pair of keepers comprising two keeper elements formed integral with the bubble at the open side of said trough and extending both inwardly toward the median of said trough and outwardly away from said trough whereby each said pair of keepers restricts the lateral opening of said trough with the maximum restriction being located outwardly from said trough said keepers being thermoformed concurrently with the thermoforming of the plastic bubble and with and upon the same mold.

4,005,777

DOUBLE WRAP PACKAGE

Daniel Richard Marantz, Port Washington, N.Y., assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 337,171, March 1, 1973, Pat. No. 3,896,604. This application Apr. 21, 1975, Ser. No. 569,963
Int. Cl.² B65D *75/28, 65/16, 65/00*
U.S. Cl. 206—497 **5 Claims**



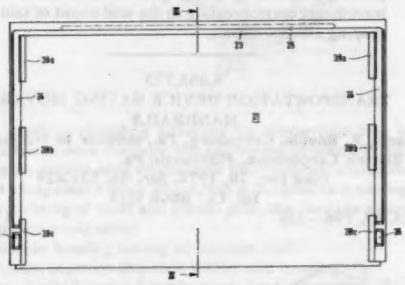
1. A package comprising a load of rectangular prismatic shape tightly encompassed by two sleeves of heat shrunk plastic film, the sleeves being at right angles to each other, the first sleeve completely covering the top, bottom and a first pair of opposed faces and partially extending over the remaining pair of opposed faces, the second sleeve completely covering the top, bottom and said remaining pair of opposed faces and partially extending over the first pair of opposed faces, and the overlapped portions of the two sleeves being heat laminated together.

4,005,778

COFFER FOR STORING NUMISMATICAL COINS

Claude H. Vuille, Fribourg, and Frederic T. Kropp, Corpataux, both of Switzerland, assignors to Michael Pfeiffer, Ottobrunn, Switzerland

Filed Mar. 31, 1975, Ser. No. 563,496
Claims priority, application Germany, Apr. 5, 1974, 2416752
Int. Cl.² A45C *11/00*; B65D *85/62*
U.S. Cl. 206—.84 **14 Claims**

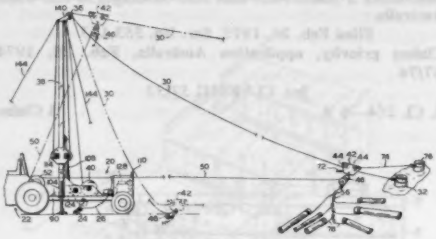


1. A coffer for storing numismatical coins comprising
a bottom wall,
a cover wall,
a set of U-shaped frames adapted for stacking, any preselected number of which can be stacked and releasably secured in fixed relation between said cover and bottom wall such that the legs and crosspiece of the individual U-shaped frames combine to define respectively side and back walls joining said bottom and cover walls,
a set of coin holding tablets adapted to slidably engage any one or more of said U-shaped frames between the legs thereof whereby any number of U-shaped frames and tablets can be chosen from said sets of frames and tablets for assembling a coffer compatable with the size of the coin collection to be stored or for adding capacity to the coffer as required, and
guide means on the legs of said frames for slidably supporting said tablets.

4,005,779
TIGHTLINE LOGGING SYSTEM

Cecil L. Andrews, P.O. Box 214, Burney, Calif. 96013

Continuation of Ser. No. 472,227, May 22, 1974, abandoned, which is a continuation of Ser. No. 321,348, Jan. 15, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,298
Int. Cl.² B66C 17/06
U.S. Cl. 212—7 11 Claims

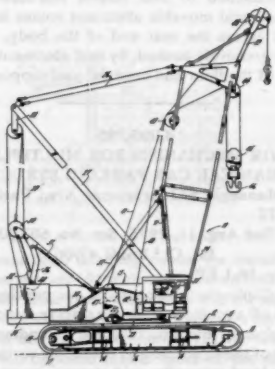


1. In a tightline logging system, comprising
a vehicle slider,
a vertical mast mounted on the vehicle slider,
a mast sheave on the upper end of the mast,
a tightline winch on the vehicle slider,
a tightline extending from the winch and over the sheave and outwardly and downwardly to a ground anchor,
a carriage on the tightline movable outwardly from the mast by gravity,
an open block carried by the carriage,
a skidder vehicle having means for detachably coupling said vehicle slider to said skidder vehicle,
a mainline winch mounted on the skidder,
and a mainline extending through the block from the mainline winch and adapted to be secured to a load and pull the carriage and the load toward the mast,
the open block permitting the mainline to be removed laterally therefrom to permit the skidder to haul the load to a position remote from the slider.

4,005,780
BOOM STOP AND BACK HITCH COMPENSATING SYSTEM

James G. Morrow, Sr., and David J. Pech, both of Manitowoc, Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.

Filed Nov. 10, 1975, Ser. No. 630,426
Int. Cl.² B66C 23/00
U.S. Cl. 212—8 R 10 Claims

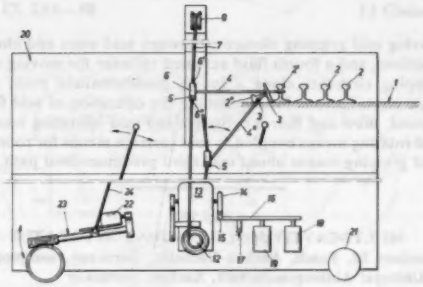


1. A boom stop compensating system for a load lifting device having a power source, a boom mounted for vertically pivoting movement, boom hoist rigging including a back hitch assembly and a boom hoist line for raising and lowering the boom and boom stop cylinder means for limiting the vertical angle to which the boom may be raised comprising, in combination, pump means for delivering fluid under pressure to the boom stop cylinder, means for sensing changes in tension in the boom hoist rigging, and regulating means interposed between said cylinders and said sensing means for increasing the fluid pressure delivered to said cylinders by said pump means as the tension in said boom hoist rigging decreases.

4,005,781
DEVICE FOR ROTATING RAILS AND ROLLED SECTIONS ABOUT THEIR LONGITUDINAL AXES

Rolando Filippeschi, Piombino (Leghorn), Italy, assignor to Acciaierie Di Piombino S.p.A., Italy

Filed July 29, 1975, Ser. No. 600,182
Claims priority, application Italy, Aug. 1, 1974, 12914/74
Int. Cl.² B65G 47/14, 47/82
U.S. Cl. 214—1 QG 5 Claims



1. A device for rotating rails and rolled sections in general about the longitudinal axis, comprising a fork suitable to be disposed around a section web, a substantially vertically disposed movable support, a bar hinged to said support, said fork being mounted perpendicularly on said bar hinged at its opposed end to the vertically movable support, power means for controlling the translation of said support along its substantially vertical path, a handling rope, two return rollers having their axes of rotation spaced, said support being connected on top and bottom to said handling rope tightened between said two return rollers, an upper and a lower one, and said power means controlling the motion of said rope in either of opposite directions.

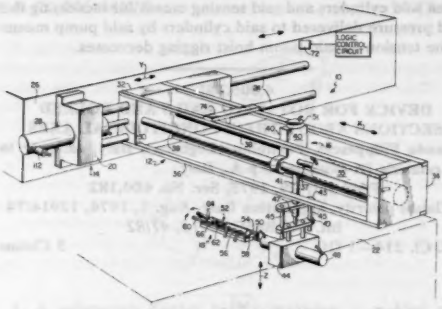
4,005,782
PICKER

Robert R. Crockett, Westfield, Mass., assignor to Engineered Metal Products Company, Inc., Chicopee, Mass.

Continuation-in-part of Ser. No. 447,667, March 4, 1974, Pat. No. 3,921,820. This application Oct. 31, 1975, Ser. No. 627,768
Int. Cl.² B25J 9/00
U.S. Cl. 214—1 BB 9 Claims

1. A picker for grippng and moving an article, comprising a mounting unit; a carrier carried by said mounting unit for movement along a first predetermined path; a first fluid actuated cylinder coupled between said mounting unit and said carrier for moving said carrier in opposite directions along said first predetermined path; carriage means slidably mounted on said carrier for movement along a second predetermined path perpendicular to said first predetermined path; a second fluid actuated cylinder coupled between said carrier and said carriage means for moving said carriage in opposite directions along said second predetermined path; gripping means mounted on said carriage means for movement along a third predetermined path perpendicular to said first and sec-

ond predetermined paths; a third fluid actuated cylinder coupled between said carriage and said gripping means for moving said gripping means in opposite directions along said third predetermined path; said gripping means including a pair of gripping elements for gripping said article, said gripping elements having open and closed positions, operating means for



moving said gripping elements between said open and closed positions, and a fourth fluid actuated cylinder for moving said gripping elements along a fourth predetermined path; and logic circuit means for controlling the operation of said first, second, third and fourth cylinders and said operating means, and rotating means coupled to said carriage means for rotating said gripping means about said third predetermined path.

4,005,783

MULTI-CAVITY MOLD LOADING APPARATUS

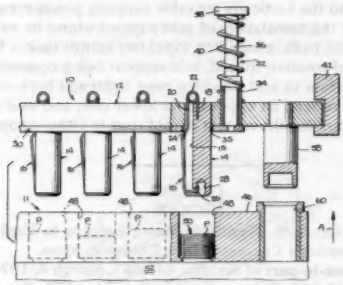
Lambert M. Pasch, Aachen-Nutheim, Germany, assignor to Uniroyal Aktiengesselschaft, Aachen, Germany

Filed Dec. 1, 1975, Ser. No. 636,782

Claims priority, application Germany, Feb. 14, 1975, 2506170

Int. Cl.² B65G 59/02

U.S. Cl. 214—1 BB **10 Claims**



1. Apparatus for inserting a plurality of molding inserts into respective mold cavities simultaneously, said appartus comprising: insert-holding means for removably holding a plurality of generally annular inserts in spaced apart relation corresponding to the relative spacing of a plurality of cavities of a multi-cavity mold, said insert-holding means including resilient projection means for frictionally securing respective ones of said annular inserts from the interior thereof; and insert-stripping means operatively associated with said projection means and inserts for stripping the latter simultaneously from their associated projection means to effect the simultaneous insertion of said inserts into respective mold cavities of the multi cavity-mold, each of said projection means including a respective spring means for resiliently engaging the interior of an associated one of said inserts, each of said projection means including a respective slotted finger in which is movable a respective one of said spring means generally laterally of the direction said inserts are stripped therefrom and from which the latter said spring means extends at least in part to engage the interior of a respective one of said inserts.

4,005,784

TRANSPORT VEHICLE

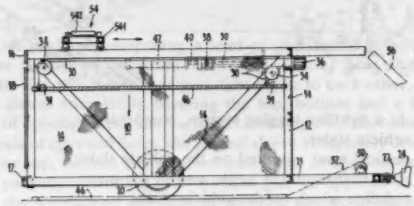
Leslie Henry Wilson, 28 Gould Street, Frankston, Victoria, Australia

Filed Feb. 26, 1975, Ser. No. 553,163

Claims priority, application Australia, Feb. 28, 1974, 6767/74

Int. Cl.² B65G 57/32

U.S. Cl. 214—6 B **5 Claims**



1. A transport vehicle for hay bales or other articles comprising a rigid body of rectangular shape supported on transport wheels, said body comprising spaced side walls and a forward end wall and being open at its rear end and also at the bottom, movable abutment means operable to extend across said open rear end of the body, a vertically movable floor within the body, power operated raising and lowering means therefor, means detachably connecting the floor to said raising and lowering means, and a substantially longitudinally extending conveyor supported in a laterally offset position adjacent the top of one of the side walls, thereby to facilitate distribution of the articles over the floor without substantially obstructing the interior space of the body, whereby the floor, after being raised to a position adjacent said conveyor, may be progressively lowered as successive layers of articles are stacked thereon and whereby, after the vehicle has been subsequently moved to a discharge position, the floor may be lowered until it rests on the ground or other supporting surface and may then be detached from said raising and lowering means, thereby to enable the vehicle to be moved forwardly leaving the floor and stack on the supporting surface behind the body, and wherein the vehicle includes means operable to pull the floor forwardly over the supporting surface to enable it to be re-attached to said raising and lowering means whereby, when said movable abutment means is so arranged as to extend across the rear end of the body, the stack of articles is progressively pushed, by said abutment means, over the rear end of the floor and onto the said supporting surface.

4,005,785

ELEVATOR MECHANISM FOR MULTIPLE LEVEL MECHANICAL CAR PARKING STRUCTURE

Carlisle F. Manaugh, 522 Arbramar Ave., Pacific Palisades, Calif. 90272

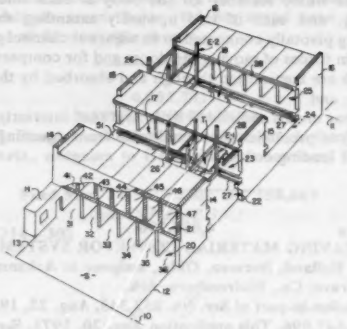
Filed Aug. 11, 1975, Ser. No. 603,337

Int. Cl.² B65G 47/00

U.S. Cl. 214—16.1 EB **3 Claims**

1. In a multiple story mechanical car parking system, the combination of: a multiple story car storage structure having a crane-way adjacent the structure and extending transversely across a face of the structure and extending vertically from the ground floor level upwardly, said storage structure having on its stories above the ground level thereof rows of adjacent storage stalls opening to the crane-way; an elevator frame

mounted in the frameway entirely above the first floor of the structure and extending upwardly toward the top of the structure; elongated rail means extending along the crane-way above the ground story of the structure for supporting the elevator frame above the ground storage; and plurality of bearing units mounting the frame on the rail means to permit reciprocal horizontal movement of the frame along the crane-way, each of said bearing units comprising dual pivotally mounted angularly displaced endless idler chain assemblies in spaced line engagement with said rail means; a drive motor



coupled to the frame independent of said bearing units for imparting such reciprocal horizontal movement of the frame along the crane-way; an elevator platform mounted in the frame for vertical reciprocal movement within the frame; motor driven winch means mechanically coupled to the platform for imparting such vertical reciprocal movement to the platform; at least one vertical elongated screw member mounted in said frame; and auxiliary drive means independent of said motor driven winch means coupling said platform to the screw member for imparting vertical reciprocal movement to the platform within the frame.

4,005,786

MECHANICAL LOAD HANDLING DEVICE FOR STOREHOUSES

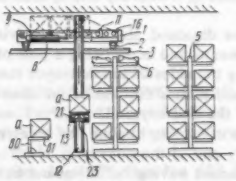
Jury Abramovich Adelson, prospekt Karla Marxa, 21, kv. 57, and Oleg Antonovich Tamkovich, Moskovsky prospekt, 153, kv. 141, both of Leningrad, U.S.S.R.

Filed Mar. 5, 1975, Ser. No. 555,618

Claims priority, application U.S.S.R., Mar. 6, 1974, 2003796

Int. Cl.² B65G *47/00*

U.S. Cl. 214—16.4 A **8 Claims**



1. A mechanical load handling device for storehouses, for keeping loads on shelves (5) with cantilevered fork racks (6), for taking out the loads from the shelves and for storing them thereon, the device comprising: a frame (1, 47) for horizontal traversing across the shelves; columns (12, 48) made fast on said frame on the opposite lateral faces of the shelves at a distance thereto; transfer means (13, 49) mounted on said columns traversably therealong and incorporating: a cross-piece (17, 50) disposed between said columns along the shelves and made up by two beams (18, 27, 36, 45, 60, 76) arranged parallel to each other in a substantially horizontal plane and so interconnected at their ends as to form a through gap therebetween; a plurality of load supporting members (21, 32, 38, 62, 74) spaced somewhat apart from one another on said beams throughout the length thereof to interact with the fork racks of the shelves in the course of taking out the loads; a carriage (23, 29, 34, 42, 52) mounting a platform (25, 30, 33, 40, 71) for selective taking out of the loads from and storing them on the fork racks; and guideways (22, 28, 35, 44, 51) adjacent to said cross-piece and serving for said carriage to traverse therealong, said guideways being so mounted that said carriage is traversable lengthwise of said gap.

4,005,787

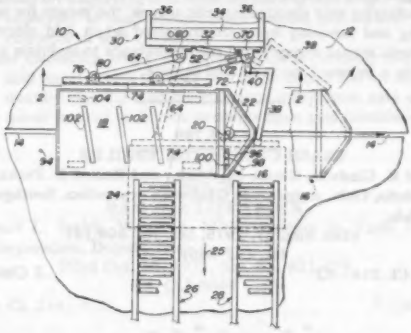
APPARATUS AND METHOD FOR UNLOADING DRIVERLESS VEHICLES

Craig F. Sleep, Bangor, Pa., assignor to SI Handling Systems, Inc., Easton, Pa.

Filed July 3, 1975, Ser. No. 592,953

Int. Cl.² B65G *67/24*

U.S. Cl. 214—58 **14 Claims**



1. Apparatus for unloading driverless vehicles while they are moving and for using the propulsion force of the vehicle comprising a vertically disposed support adapted for installation alongside a guided path for driverless vehicles, a cantilever arm pivoted at one end to said support, said arm having an extended position projecting generally horizontally at an elevation for contact with a front end portion of a vehicle so that the vehicle pushes the cantilever arm out of its way thereby pivoting the cantilever arm with respect to said support to a retracted position of said arm, a sweep arm supported by said support at an elevation so that it can move from a retracted position to an extended position and push a load off the deck of a vehicle, and means connecting said cantilever arm to said sweep arm so that the sweep arm moves to is extended position when said cantilever arm is moved to its retracted position by the force imparted to the cantilever arm by the vehicle whereby a separate motive force for the sweep arm is unnecessary.

4,005,788

VEHICULAR DELIVERY RAMP APPARATUS

Roger D. Ratliff, Irving, Tex., assignor to Pepsico Inc., Purchase, N.Y.

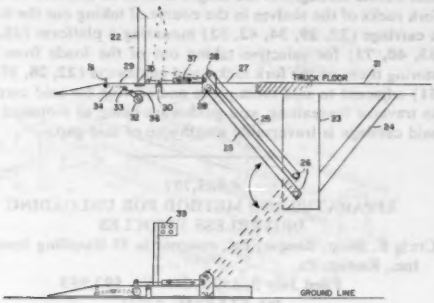
Filed Oct. 1, 1975, Ser. No. 618,400

Int. Cl.² B60P *1/48*

U.S. Cl. 214—77 P **5 Claims**

1. In a ramp loading apparatus for raising or lowering cargo to or from a truck floor bed by a hydraulically controlled ramp loader, the improvement which comprises a cargo restraint means including a gate disposed in the surface of said loader and capable of vertical extension relative to said surface; an integral, magnetic counterbalance, said gate and said counter-

balance being pivotally connected such that the spatial disposition of the counterbalance causes an opposite spatial disposition of the gate; electromagnetic means spatially disposed to effect an electromagnetic field on said counterbalance when



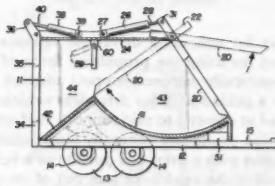
said gate assumes a recessed mode in said surface; and means for actuating said electromagnetic means, the means for said raising and lowering being de-energized when said electromagnetic means engages said counterbalance to maintain said gate in a recessed mode in said surface.

4,005,789

TRASH COMPACTOR TRAILER

Floyd R. Gladwin, Grosse Ile, Mich., and Robert B. Packard, Toledo, Ohio, assignors to Gladwin Corporation, Southgate, Mich.

Filed Aug. 27, 1975, Ser. No. 608,181
Int. Cl.² B65F *3/00*
U.S. Cl. 214—82 **2 Claims**



1. In a trash compactor comprising a box-like body mounted upon wheels for forming a trailer for towing behind a vehicle, said body including a roof, a floor, and first and second open ends, first and second doors closing each of said open ends, respectively, each door being swingably mounted at its upper end to said roof for pivoting about a horizontal axis, and actuatable means for swinging said doors and for holding them in closed positions, the improvement comprising:

the first end of said body being sloped downwardly and forwardly at an acute angle and said first door normally being positioned for closing the open first end;

said first door actuated for swinging outwardly to open said first end of said body;

said second door actuated for swinging outwardly to open the second end of said body;

said floor being arcuately shaped from said body open first end to a location intermediate said body ends to define a loading compartment for trash interiorly of said body;

said floor being thereafter sloped downwardly to said body open second end to define a trash storage compartment interiorly of said body; and

said first door also actuated for swinging through said trash loading compartment to sweep and compact trash generally upwardly against said roof, said compacted trash thereafter falling into said trash storage compartment;

said arcuate floor shape corresponding to the arcuate path of movement of said first door interiorly of said trash loading compartment;

an upwardly extending member formed on each of the upper corners of the door, and each having a fluid operated cylinder having a piston rod connected to each of said frame members and each cylinder being pivotally connected within a channel extending along the upper side edges of the body, with each channel forming an upper frame member for the body at each side of the body, and each of said upwardly extending members being pivotally connected to its adjacent channel portion;

wherein forces of moving the doors and for compacting the trash are transmitted through and absorbed by the channels; and

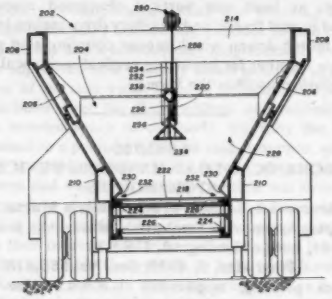
deflector means suspended from said roof interiorly of said body to preclude compacted trash from returning to said trash loading compartment.

4,005,790

PAVING MATERIAL CONVEYOR SYSTEM

John H. Holland, Norman, Okla., assignor to Arkansas Rock and Gravel Co., Mufreesboro, Ark.

Continuation-in-part of Ser. No. 852,345, Aug. 22, 1969, Pat. No. 3,647,096. This application Aug. 20, 1971, Ser. No. 173,423
The portion of the term of this patent subsequent to Mar. 7, 1989, has been disclaimed.
Int. Cl.² B60P *1/38*
U.S. Cl. 214—83.36 **8 Claims**



1. The system for delivering a batch of particulate material at a controlled rate which comprises:

conveyor means for transporting particulate material from a receiving zone to a delivery end spaced from the receiving zone,

hopper means disposed above the receiving zone of the conveyor means and comprising a pair of side walls disposed along the sides of the conveyor means and an end wall disposed across the end of the conveyor means remote from the delivery end,

the side walls extending beyond the receiving zone toward the delivery end of the conveyor,

the hopper means having baffle means extending through the receiving zone parallel to and spaced above the conveyor means,

said baffle means leaving a substantial portion of the conveyor means exposed vertically to the material above the baffle means,

said baffle means having surfaces which diverge downwardly from an apex for establishing increased horizontal pressures in a horizontal tube tending to cause bridging of the material in the zone and an upwrdly extending web for supporting the downwardly diverging surfaces,

said baffle means further comprising a stiffening web extending substantially vertically from the apex and along substantially the entire length of the baffle means whereby the baffle means is adapted to be supported solely at its ends,

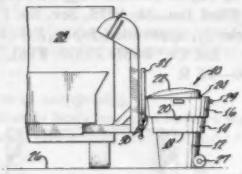
the hopper means having an open delivery end to at least the height of the horizontal zone whereby the particulate material will tend to shear longitudinally along the length of the receiving zone in said horizontal zone as a result of the bridging tendencies of the material and will be delivered from the receiving zone to the delivery end at a volumetric rate determined by the cross-sectional area of the hopper means below the horizontal zone and the speed of the conveyor means.

4,005,791

REFUSE CONTAINER

Marcel G. Stragier, and Theodore J. Peterson, both of Scottsdale, Ariz., assignors to Government Innovators, Phoenix, Ariz.

Filed Mar. 17, 1975, Ser. No. 558,669
Int. Cl.² B65F 3/02
U.S. Cl. 214—302 **8 Claims**



5. A flexible refuse container in combination with a refuse collection vehicle having an arm movable from a lowered position to a raised position for engaging, lifting, and inverting the container to dump its contents into the vehicle, said container comprising:

a bottom;

a lower side wall portion connected to said bottom containing refuse;

a flexible middle side wall portion connected on the upper end of said lower portion;

a first generally horizontal shoulder integrally connecting said lower and middle portion;

an upper side wall portion attached to the upper end of said middle portion; and

a second generally horizontal shoulder integrally connecting said middle and upper portions, said middle portion receiving said arm, said first and second shoulder preventing deflection in said lower and upper portions when said arm engages said middle portion during operation of said system.

4,005,792

AUTOMATIC UNLOADING APPARATUS

Charles Schulman, Paris, and Roger M. Petit, Clichy, both of France, assignors to I E R Impression Enregistrement des Resultats S.A., Paris, France

Filed Oct. 16, 1975, Ser. No. 623,255
Claims priority, application France, Oct. 22, 1974, 74.35392
Int. Cl.² B65G 65/04
U.S. Cl. 214—309 **12 Claims**

1. Apparatus for automatically unloading and delivering the contents, such as a plurality of mail envelopes, from a container, comprising:

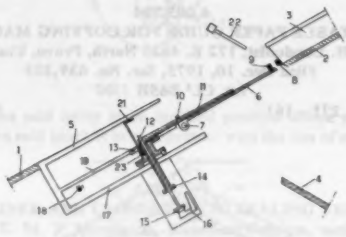
means for supplying a filled container;

said container having aperture means adjacent the bottom and one end thereof;

blade means movable parallel to the bottom of said container and being insertable through said aperture means to pass into said container;

finger means slidably mounted in said blade means and movable substantially perpendicularly to said blade means;

said finger means being insertable through said aperture means to pass into said container when said blade means is fully disposed within said container; and



means for displacing said blade means and said finger means relatively to said container to unload and deliver the contents of said container;

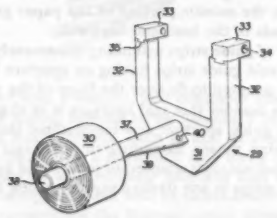
said displacing means including means for initially moving said finger means through said blade means and for subsequently moving said blade means away from said container bottom to lift the contents from said container.

4,005,793

RAM FOR LIFT TRUCK

Robert L. Smith, Westland, Mich., assignor to Kasle Steel Corporation, Detroit, Mich.

Filed Oct. 10, 1975, Ser. No. 621,438
Int. Cl.² B66F 9/12
U.S. Cl. 214—620 **7 Claims**



1. In a lift truck of the type having a cab, a pair of vertically driven, parallel, spaced apart hangers mounted in front of the cab and a generally rectangular carriage mounted on the front of the hangers to move therewith, the improvement of a ram for engaging and lifting coiled stock, spools or the like comprising:

a plate having a generally U-shaped configuration including a horizontal base and two upwardly extending spaced apart legs;

said legs for mounting said ram on said rectangular carriage frame; and

an elongated bar extending from said horizontal plate base outwardly away from said rectangular frame for engaging the center of coiled stock;

said legs of said ram plate being spaced apart horizontally to be mounted outwardly of said hangers so that upon engaging stock and lifting the stock by vertically driving said hangers, the stock may be observed from the cab without the legs of said ram obstructing the view of said stock therefrom, and an extension block for each plate leg, each extension block having a hole journalled there-

through to receive the upper horizontal carriage frame member;

each extension block and its corresponding plate leg including a tongue and groove so that after suspending the extension blocks from said carriage frame, the U-shaped plate and ram may be lifted and slid onto the extension blocks with the plate legs and extension blocks mechanically interlocked by said tongues and grooves.

4,005,794

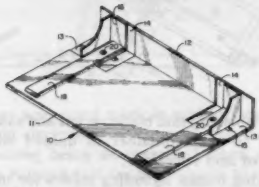
ADJUSTABLE PAPER GUIDE FOR COPYING MACHINES

Robert H. Lundquist, 172 E. 4635 North, Provo, Utah 84601

Filed Dec. 10, 1975, Ser. No. 639,355

Int. Cl.² B65H *1/00*

U.S. Cl. 271—161 **5 Claims**



1. A paper tray assembly comprising:

a. a flat base having a backwall extending upwardly at right angles to the base;

b. rectangular recesses in the corners of the base adjacent the backwall, each recess containing a longitudinal slot therein;

c. coinciding recesses in the backwall adjacent the rectangular base recesses;

d. a pair of longitudinally adjustable paper guides slidably engaged in said recesses having a floor, rearwall and end wall portions, said floor portion containing an aperture which is in alignment with the longitudinal slot, said paper guides being further characterized in that the endwalls are on the outside portion of the paper guide relative to the ends of the base and backwall;

e. a pair of guide strips extending transversely across the flat base, said guide strips having an aperture in one end and being adapted to fit over the floor of the paper guides in such a manner that said aperture is in alignment with the paper guide aperture and longitudinal slot;

f. fastening means extending through said apertures and longitudinal slots adapted to secure said paper guides and guide strips in any desired position along the longitudinal slots.

4,005,795

COLLAPSIBLE CONTAINER

Jorgen Mikkelsen, Wynberg, Cape Province; David Rennie Kingsley Groves, Constantia, Cape Province, and Peter John Herbert, Bishopscourt, Cape Province, all of South Africa, assignors to Plastipak (Proprietary) Limited, Cape Town, Cape Province, South Africa

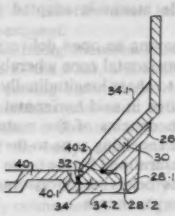
Filed Oct. 14, 1975, Ser. No. 622,198

Claims priority, application South Africa, Oct. 18, 1974, 74/6647

Int. Cl.² B65D *7/24, 7/42*

U.S. Cl. 220—7 **15 Claims**

1. A container blank comprising a base panel; wall panels joined to the base panel and each having marginal edge portions at an angle to the remainder of the respective panel for overlapping edge portions of adjacent wall panels, adjacent edge portions having free ends which point in opposite directions when the blank is erected to form a container; and a lid panel joined to one of the wall panels along an edge thereof remote from its junction with the base panel, wherein the junctions between the panels are formed by hinges which are integral with the panels, wherein interengageable fingers and openings are provided for releasably securing the walls in their



erected condition, and wherein the fingers are disposed on and integral with the edge portions of at least some of the wall panels for freely passing through the openings and hooking over the edge portions of the adjacent wall panels.

4,005,796

MASTER CYLINDERS FOR HYDRAULIC AUTOMOTIVE BRAKE SYSTEMS

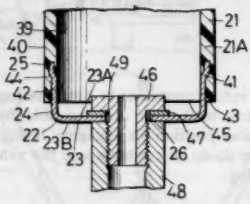
Akiyoshi Hirai, and Hiroshi Uemura, both of Toyoda, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Jan. 24, 1975, Ser. No. 543,775

Claims priority, application Japan, Feb. 14, 1974, 49-17793

Int. Cl.² B65D *25/00*; F16L *5/00*

U.S. Cl. 220—85 R **7 Claims**



2. In combination with a master cylinder for a hydraulic automotive brake system, wherein a horizontally disposed cylinder having an internally threaded upright tubular extension formed thereon and a vertically disposed cylindrical brake fluid reservoir made of plastic material, and positioned above said cylinder are connected with each other in a fluid-tight but mutually communicative manner by an axially bored belt extending into said tubular extension through an annular washer associated with said bolt and a circular opening provided at the bottom of said reservoir;

the improvement which comprises:

a metal connecting member having an outer peripheral edge secured to said bottom of said reservoir and an inner peripheral edge defining a circular hose having a diameter which is smaller than that of said circular opening of said reservoir, said circular hole of said connecting member being coaxial with said circular opening of said reservoir, said tubular extension, said bolt and said washer, said inner peripheral edge of said connecting member being interposed between said tubular extension and said washer in a fluid-tight manner, said bolt extending through said circular hole of said connecting member, said diameter of said circular hole being larger than the inner diameter of said tubular extension but smaller than the outer diameter thereof;

said diameter of said circular opening of said reservoir being larger than the outer diameter of any of said tubular extension, said bolt and said washer;

wherein said reservoir comprises a cylindrical side wall having a cylindrical inner surface defining an inner diameter which is equal to said diameter of said circular open-

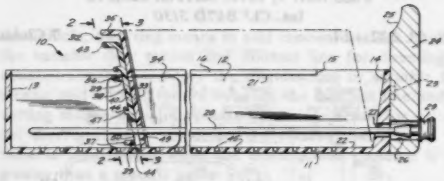
ing, and a cylindrical outer surface encircling said inner surface; and said connecting member comprises a bowl-shaped structure made of metal having a wall thickness which is smaller than the thickness of said cylindrical side wall of said reservoir, said outer peripheral edge of said connecting member being embedded in said cylindrical side wall of said reservoir at the lower end of said cylindrical side wall, said reservoir and said bowl-shaped structure being a product of an integral molding operation.

4,005,797

CARD FILE DRAWER FOR APERTURED INDEX CARDS

Harold M. Ingram, Williamsport, Pa., assignor to Bro-Dart Inc., Williamsport, Pa.

Filed Jan. 28, 1976, Ser. No. 653,041
Int. Cl.² B65D *01/24*; B42F *17/16*
U.S. Cl. 220—22.5 **6 Claims**



1. A card file drawer comprising:

a. an elongated drawer body having a bottom wall, two side walls, a back wall, and a front wall, the top of the drawer being open,

b. a rib extending along the upper edge of each side wall, said ribs projecting inwardly toward each other and being spaced apart a distance equal to the length of the cards with which the drawer is used,

c. a support within said drawer body for supporting the rear end of a group of cards in the drawer, said support including a member extending crosswise of the drawer body and an end piece at each end of said member, each end piece being a plate-like element having parallel upper and lower edges, the distance between the outer faces of said end pieces being equal to the distance between the inner faces of said drawer side walls, and the distance between the upper and lower edges of each end piece being equal to the distance between each rib and the drawer bottom wall, whereby said upper and lower edges are slidably and non-rotatably arranged against said rib and bottom wall, respectively, and

d. aligned holes in the drawer front wall and in said support, and a rod passing through both of said holes, said rod also passing through aligned holes in any cards which may be in the drawer so as to prevent removal of the cards from the drawer.

4,005,798

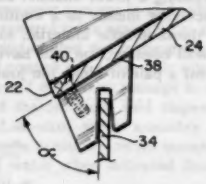
LID MOUNT

Norman C. Minsky, West Bend, Wis., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Sept. 19, 1975, Ser. No. 615,014
Int. Cl.² B65D *25/00*
U.S. Cl. 220—85 CH **4 Claims**

1. A cooking utensil comprising a pan and cover therefor, wherein the improvement comprises:

an elongated block having a first surface in contact with said cover along a peripheral edge thereof, said block having a second surface comprising the opposite side of the block relative to said just surface, said second surface containing an open-ended slot extending across the longitudinal extent thereof for engaging a portion of the rim of said pan, the lateral extent of said slot disposed in said block at an acute angle with respect to said first surface to



orient said cover in an inclined position above said pan when said block is in engagement with the rim of said pan.

4,005,799

CONTAINER AND CLOSURE WITH SEALING THREADS

Livinus E. M. J. Mannaerts, Kapellen, Belgium, assignor to Koninklijke Emballage Industrie Van Leer B.V., Amstelveen, Netherlands

Continuation of Ser. No. 425,821, Dec. 18, 1973, abandoned. This application Dec. 11, 1975, Ser. No. 639,978
Claims priority, application Germany, Dec. 18, 1972, 2261982
Int. Cl.² B65D *41/04*
U.S. Cl. 220—288 **6 Claims**

1. A container with a closure, said container comprising a cylindrical neck having internal screw threads, a closure plug having external screw threads, each of said external threads including an inclined face, a horizontal face and a cylindrical core face connecting said inclined face and said horizontal face, said plug being screwable with its external screw threads into or out of respectively the internal screw threads of the neck, a sealing ring between said neck and an outer end of the plug, said internal and external screw threads being in direct engagement over one part of the horizontal face and having play between the internal screw threads and the inclined face, the core face and the other part of the horizontal face of the external screw threads, said external screw threads near an inner end of the plug being provided with a first radially directed flexible bar which extends over the full width of faces which have play with the internal screw threads so as to completely seal the play.

4,005,800

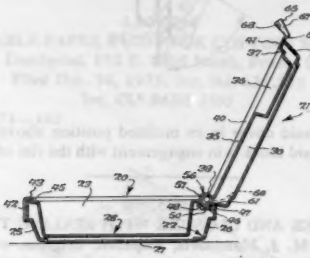
PLASTIC CONTAINER HINGE AND LATCH

Peter T. Schurman, Woodbridge, Conn., assignor to The Plastic Forming Company, Inc., Woodbridge, Conn.

Division of Ser. No. 288,707, Sept. 13, 1972, Pat. No. 3,902,628. This application Jan. 29, 1975, Ser. No. 545,142
Int. Cl.² B65D *51/04*, *25/18*
U.S. Cl. 220—337 **6 Claims**

1. A container comprising a body portion being of double wall thermoplastic material having a pair of hinge pin receiv-

ing means, each said hinge pin receiving means being integrally formed with said body portion into a hollow journal bearing, and a trough formation being integrally formed with said body and including a lower channel extending between said hinge pin receiving means in a continuous manner, a cover portion of thermoplastic material, said cover portion being of double wall construction and having formed as an integral part thereof a pair of hinge pin journals, and a joint



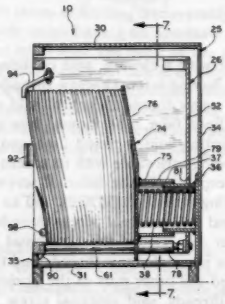
formation extending between said hinge pin journals, said joint formation including a portion received in said trough formation with said hinge pin journals being correspondingly received in said journal bearings whereby said joint formation of said cover portion co-acts with said lower channel of said trough formation to provide a hinge joint, said hinge joint being closed in all open positions of said cover portion as viewed from within said open positions.

4,005,801

BAG STORING AND DISPENSING APPARATUS

Malcolm E. Musser, P.O. Box 386, Jackson Center, Ohio 45334

Filed Jan. 14, 1976, Ser. No. 648,891
Int. Cl.² B65H *1/08*
U.S. Cl. 221—56 **17 Claims**



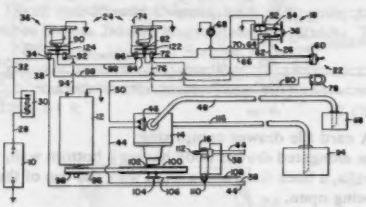
1. Apparatus for storing and successively dispensing paper bags in opened condition, wherein each bag includes opposite side walls and opposite end walls connected by a bottom wall and being foldable between an open condition and a collapsed condition with the end walls folded between the side walls and the bottom wall folded against one of the side walls, said apparatus comprising a box-like structure defining a bag storing chamber and having a rectangular front opening and means for supporting a stack of substantially vertically arranged collapsed bags in said chamber with the upper end portion of said one side wall of the front-most bag in the stack exposed for manual gripping, restraining means adjacent the front opening for normally restraining the stack of bags in the chamber and for restraining the other side wall of the front-most bag when said one side wall is pulled from said restraining means, a transversely extending opening bar across the front opening and near the bottom thereof against which the entire lower half of the bottom wall of the bag engages, said opening bar being positioned below the restraining means and spaced inward of the restraining means such that the upper portion of the bags extends forward through the opening, a pusher member supported within said structure and engaging the back of the stack of bags, and means resiliently biasing said pusher member toward the front opening to continually maintain the front-most bag against the opening bar and the restraining means, whereby pulling upward on the one side wall of the bag causes unfolding of the bottom wall and opening of the bag as the bag is removed from the stack.

4,005,802

APPARATUS FOR TRANSFERRING AND METERING FLUIDS

Robert Eugene Fox, Minburn, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Nov. 7, 1975, Ser. No. 629,972
Int. Cl.² B67D *5/30*
U.S. Cl. 222—14 **7 Claims**



1. Apparatus for conveying and metering a desired volume of fluid from a fluid supply to a fluid deposit comprising: an electrical source; a motor; a fluid displacing pump driven by the motor and having an inlet in communication with the fluid supply and an outlet in communication with the fluid deposit, means responsive to pump action, including switch means effective to close in a predetermined relationship to pump fluid displacement; counter means, including for indicating a desired fluid displacement, said counter means being responsive to closing of the switch means for indicating the cumulative volume displaced by the pump; relay means including a first and second relay, said second relay responsive to activation of the first relay to connect the electrical source with the motor, source control means including a manually activated power switch and start means, said power switch movable between a first activated and second deactivated position, and when in the first position effective to connect the electrical source and start means, and said start means responsive to manual activation and effective when activated and when the power switch is in the activated position to connect the source with said first relay; and reset means responsive to indicated volume displaced and effective to disconnect the first relay and electrical source when said volume displaced is equivalent to the indicated desired volume displacement whereby said second relay is deactivated to thereby disconnect the electrical source and motor.

4,005,803

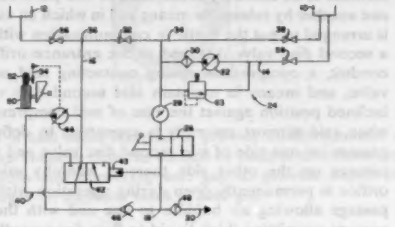
CHEMICAL CONCENTRATE INJECTION SYSTEM

Brian Elwood Kent, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 22, 1975, Ser. No. 606,522
Int. Cl.² A01C *15/00*
U.S. Cl. 222—57 **6 Claims**

1. An apparatus for use in spraying fluids from a vehicle comprising: a dilutent supply supported on the vehicle; at least one container for a concentrate formulation supported on the vehicle; a dilutent line connected to said dilutent supply;

means in said dilutent line for creating a pressure in said dilutent line; a concentrate line connected between said container and said dilutent line downstream of said pressure creating means; variable flow means in said concentrate line for creating a variable flow rate therein having a pressure greater than the pressure in said dilutent line; means coupled with said variable flow means for causing said flow means to vary the concentrate flow rate in proportion to the speed of



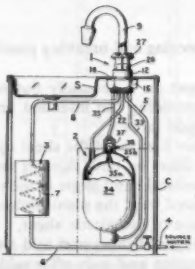
the vehicle; diverting means in said concentrate line between the variable flow means and dilutent line for directing all concentrate flow to either the dilutent line or variable flow means; and control means between the dilutent line and diverting means including pressure sensing means for causing the diverting means to divert the concentrate flow to the variable flow means when the dilutent line pressure is not greater than a specific value.

4,005,804

MULTI-CONTROL VALVE DISPENSING HEAD AND HEATED AND CHILLED WATER DISPENSING SYSTEM UTILIZING THE SAME

Richard C. Dreibelbis, Fair Lawn, N.J., assignor to Emerson Electric Co. (H & H Thermostats Div), St. Louis, Mo.

Filed Dec. 15, 1975, Ser. No. 640,408
Int. Cl.² B67D *5/60*
U.S. Cl. 222—144.5 23 Claims



1. A dispensing head for use in a heated fluid and chilled fluid dispensing system.

a. a valve body having connecting means for attaching the dispensing head at a point generally remote from the dispensing system,

b. said valve body having a common discharge spout for heated water and chilled water delivered thereto,

c. a first normally closed control valve assembly and a second normally closed control valve assembly disposed in said valve body in spaced relation to each other and respectively to the discharge spout,

d. a first cross-over passage in said valve body in communication with the discharge spout for delivering heated fluid thereto to be dispensed,

e. said first control valve assembly operatively associated with the first cross-over passage to control the flow of heated fluid thereto from said dispensing system when said first control valve assembly is actuated from closed to open position and to terminate dispensing of said heated fluid when actuated from open to closed position,

f. a second cross-over passage in said valve body connecting the second control valve assembly to the discharge spout for deliverying chilled water thereto to be dispensed,

g. said second control valve assembly operatively associated with the second cross-over passage to control the flow of chilled fluid thereto from said dispensing system when said second control valve assembly is actuated from closed to open position and to terminate dispensing of said chilled water when actuated from open to closed position, and

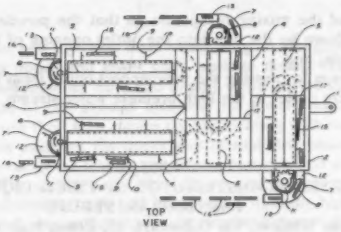
h. check valve means connected to the valve body operative to prevent unwanted intermixing of heated water and chilled water during the delivery of chilled water and mixtures thereof.

4,005,805

SINGLE OR MULTIPLE FURROW SUGAR CANE PLANTING MACHINE

Juan Sebastian Faxas, P.O. Box 1122, Clewiston, Fla. 33440

Filed Aug. 19, 1975, Ser. No. 600,610
Int. Cl.² A01C *15/00*
U.S. Cl. 222—178 6 Claims



1. A seed cane planter comprising a wheeled frame, having an upper container for canes to be planted and a lower compartment containing a plurality of conveyors, each of said conveyors being mounted for movement between a first position within the outline of the frame and second position extending from a feed end below the container to a discharge end beyond the frame and above an adjacent furrow, and spaced bars at the bottom of said container at the feed ends of said conveyors in the second position, said bars being aligned with the conveyors, so that the seed cane falls on each of said conveyors with their axes parallel to the axis of the conveyor.

4,005,806

APPARATUS FOR INJECTION OF HYGROSCOPIC POWDERS INTO A HIGH PRESSURE LIQUID STREAM

Bruce B. Baldwin, Grand Rapids, Mich., assignor to Belknap Corporation, Grand Rapids, Mich.

Filed Nov. 3, 1975, Ser. No. 627,970
Int. Cl.² B67D *5/54*
U.S. Cl. 222—193 16 Claims

1. An apparatus for injecting fine hygroscopic powder into a flowing high pressure stream of liquid, said apparatus comprising:

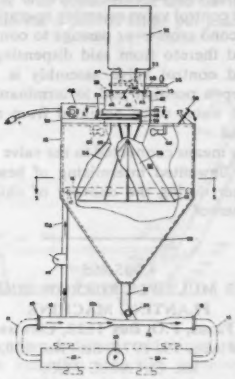
a mixing receptacle having a collector surface near a bottom portion thereof and an outlet opening at the bottom of the receptacle;

a flared dispersing surface mounted within the receptacle above the outlet such that the surface spreads outwardly and downwardly and the powder dispensed from the dispersing surface falls on the collector portion of the mixing receptacle;

means for dispensing powder to an upper portion of the

dispersing surface so that the powder is dispersed as it flows down the dispersing surface and onto the collector portion of the receptacle;

means for supplying a film of water to the collector portion



of the mixing receptacle so that the powder is washed down by the film into the outlet opening of the receptacle; and

means for passing the powder and liquid from the receptacle outlet to the high pressure water stream.

4,005,807

METERING-DISTRIBUTOR OF THICK LIQUIDS, IN PARTICULAR, SYRUPS

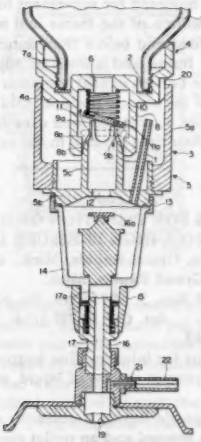
Alfredo Wiesner, Via O.Beccari, 23, Rome, Italy (00100)

Filed June 10, 1975, Ser. No. 585,498

Claims priority, application Italy, June 19, 1974, 51606/74

Int. Cl.² G01F *11/28*

U.S. Cl. 222—442 **2 Claims**



1. An improved metering-distributor for thick liquids contained in a bottle mounted on said metering-distributor in overturned position and comprising a support member through which a vertical conduit is arranged to put the bottle, mounted thereon, in communication with a cup placed therebelow and provided with an air intake from the atmosphere, in this cup reciprocating the upper shaped portion of a coaxial piston, the upper head of which is shaped to form a disc valve body adapted to close the outlet orifice of said conduit while at the lower portion of said piston a vertical conduit is arranged which opens at its lower end on the outside and its upper portion opens into the cup only in the upper limit position of the piston which is returned to its lower position by spring means, characterized by the fact that said support member is an assembly constituted of two parts connected to one another by releasable means and in which an axial conduit is arranged to put the bottle in communication with the cup, , a second disc valve disposed at the entrance orifice of said conduit, a compression spring contacting said second disc valve, and means to maintain said second disc valve in an inclined position against the bias of said compression spring when said support assembly is assembled to define a wider passage on one side of said second disc valve and a narrower passage on the other side thereof, whereby said entrance orifice is permanently open during operation with the wider passage allowing air bubbles to rise and with the narrower passage permitting thick liquid to flow downwardly.

4,005,808

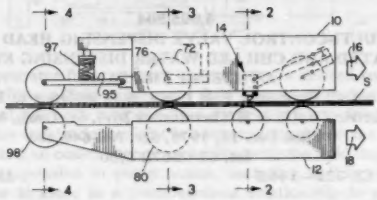
PLASTIC CUTTING METHOD

Thomas A. Insolio, Bristol, Conn., assignor to The Fletcher-Terry Company, Farmington, Conn.

Continuation-in-part of Ser. No. 437,982, Jan. 30, 1974, abandoned. This application May 2, 1975, Ser. No. 573,813

Int. Cl.² B26F *3/02*

U.S. Cl. 225—2 **6 Claims**



1. A method for scoring and breaking plastic sheet material and comprising:

a. placing the sheet on a generally flat surface at a first location, and providing the intended line of cut over a raised bead in said table,

b. scoring the upper surface of the sheet opposite the bead,

c. deflecting said sheet on both sides of the resulting score line through a critical bend angle in the range between 4° and 6° as measured from the plane defined by the initially flat upper surface of the plastic sheet,

d. further deflecting said sheet past said critical bend angle at a second location and only after said first mentioned deflecting step, and

e. heating said scoring tool to a temperature in the range between 750° and 1500° F prior to said scoring step.

4,005,809

DISPENSER CARTON

William W. Finn, 303 N. Kalamazoo Ave., Marshall, Mich. 49068

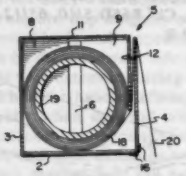
Continuation-in-part of Ser. No. 441,880, Feb. 12, 1974, Pat. No. 3,942,417. This application Apr. 11, 1975, Ser. No. 567,399

Int. Cl.² B26F *3/02*

U.S. Cl. 225—49 **6 Claims**

1. A dispensing carton adapted for the dispensing of a length of material from a roll thereof, said carton being formed of sheet material and having a bottom wall, a pair of substantially parallel, upstanding, spaced apart front and rear

walls joined to said bottom wall, and a pair of end walls, said sheet material having its outer skin ruptured at the juncture of said bottom wall with said front wall to a depth less than the



thickness of said sheet material to provide at said juncture a gap, and an abrasive material carried by each of said front and bottom walls and bordering said gap to provide a pair of tearing edges on opposite sides of said gap.

4,005,810

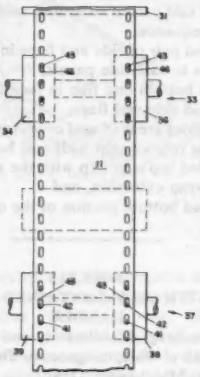
CONTINUOUS LIBRARY CATALOG CARD

Virgil V. Porter, 95-255 Hoeu Place, Mililani, Hawaii 96789

Continuation-in-part of Ser. No. 326,063, Jan. 23, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,980

Int. Cl.² B65H *17/38*

U.S. Cl. 226—6 **4 Claims**



3. The method of feeding a continuous web, marginally punched, metrically dimensioned form on a machine having an endless array of driven feed pins with a one-half inch spacing between pins, comprising the steps of: providing a form having at least one margin with spaced feed perforations, the perforations being elongated in the longitudinal direction of feed to provide a longitudinal perforation dimension substantially greater than the transverse perforation dimension and substantially greater than the pin longitudinal dimension; engaging one perforation driving edge with one feed pin; driving the one feed pin and thereby the continuous length web material in the driving direction; thereafter releasing the one feed pin from its driving engagement with the one perforation driving edge; thereafter moving the feed pins to engage the next feed pin with the corresponding next feed perforation driving edge while simultaneously holding continuous web stationary; thereafter advancing said next feed pin and continuous length web; and thereafter indefinitely repeating the above three preceding steps for successive pin feeds and feed perforations.

4,005,811

ROOF BOLT INJECTION MAST

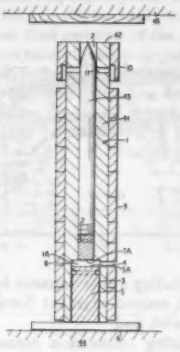
John Francis Garaty, Fairy Meadow, Australia, assignor to Australian Iron & Steel Works Proprietary Limited, Port Kembla, Australia

Filed May 27, 1975, Ser. No. 581,183

Claims priority, application Australia, May 30, 1974, 7714/74

Int. Cl.² B25C *5/10*

U.S. Cl. 227—124 **10 Claims**



1. A roof bolt injection mast comprising an elongate member having upper and lower ends, passage means extending through said member from end to end, a first piston disposed in a portion of said passage means at the lower end thereof, high pressure fluid inlet means communicating with said passage means adjacent the upper end of said first piston, and means providing for relative movement between said member and said first piston under the influence of a high pressure fluid introduced through said inlet means; whereby high pressure fluid will sequentially lock said member between the floor and the roof of a tunnel and inject a roof bolt from said passage means into the strata of said roof by means defining a second piston received in said passage means; said first piston and said portion of said passage means having substantially larger diameters than said means defining said second piston and the remainder of said passage means and said second piston and the remainder of said passage means having diameters substantially the same as the diameter of said roof bolt.

4,005,812

ELECTRIC FASTENER DRIVING TOOL

Richard H. Doyle, Mount Prospect; Salvatore L. Morabito, Northlake; Andrew I. Yohana, Des Plaines, and Raymond F. Novak, Schiller Park, all of Ill., assignors to Duo-Fast Corporation, Franklin Park, Ill.

Filed June 4, 1975, Ser. No. 583,847

Int. Cl.² B25C *1/06*

U.S. Cl. 227—131 **18 Claims**

1. An electric fastener driving tool comprising:

a clamshell body including first and second similar molded plastic body parts abutting one another along a plane coinciding with the vertical plane of symmetry of the body, said body including a head portion enclosing a cavity and a handle portion integral with and extending from said head portion;

wall means integral with said body parts extending into said cavity and defining a solenoid chamber;

a solenoid winding having a central axial opening supported within said solenoid chamber by said wall means;

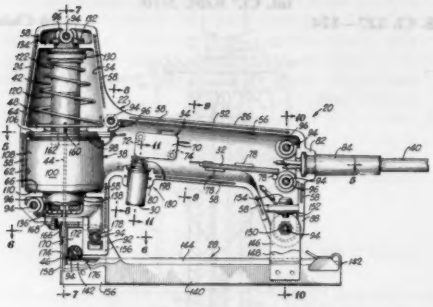
an armature slidable in said central axial opening in drive and return strokes;

a driver blade supported by said armature;

a magazine assembly supported by said body at the base of

said head portion and at said handle portion, said magazine assembly defining a drive track for said driver blade and including means for introducing fasteners into said drive track;

circuit means including a switch supported within said handle portion for selectively controlling the energization of said solenoid winding;



said armature including a first segment formed of magnetic material and a second segment formed of electrically insulating material; and

electrically insulating connection means supporting said driver blade on said first segment of said armature.

4,005,813

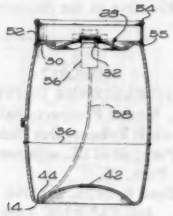
SINGLE-OPENING BEER KEG AND METHOD OF PRODUCING FROM CONVENTIONAL KEG

Mack S. Johnston, 1065 Lomita Blvd., No. 220, Harbor City, Calif. 90710

Filed Oct. 6, 1975, Ser. No. 620,146

Int. Cl.² B23K *31/02*; B21D *51/00*

U.S. Cl. 228—184 **4 Claims**



1. The method of modifying a keg which has a side wall with an upper end and a lower end, and which further includes a top wall containing a dispensing opening, and a recessed bottom wall containing an internal, peripheral chine with a radially-extending trough interconnecting said chine with the center portion of the bottom wall, including the steps of:

moving the center portion of the bottom wall outwardly until the center portion thereof is in substantial horizontal alignment with the lower end of the side wall;

providing an opening in the center portion of the bottom wall for receiving a valve assembly;

closing the dispensing opening in the top wall; and

moving the center portion of the top wall inwardly to provide a generally spherical portion with an inner peripheral chine.

4,005,814

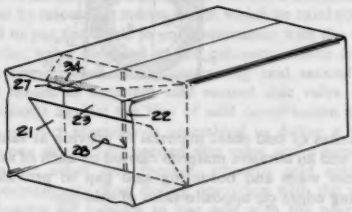
CARTON WITH INTEGRAL OVERWRAP

Thomas W. Foster, Palo Alto, Calif., assignor to Fibreboard Corporation, San Francisco, Calif.

Filed June 3, 1976, Ser. No. 692,498

Int. Cl.² B65D *5/10*, *65/12*, *65/14*

U.S. Cl. 229—39 R **4 Claims**



1. An overwraped carton structure of tubuar shape adapted to be end-loaded with a product and thereafter have the ends sealed, and formed from a cut and scored paperboard blank integrally combined with a flexible overwrap which completely covers carton structure;

said carton structure comprising a bottom panel, side panels and a top panel, bottom ends flaps and top ends flaps hinged respectively to each end of said panels and an end extension of said overwrap at each of said carton structure;

said top end flaps being of trapezoidal shape and said end extension of overwrap being adhered to said top end flaps but free of adherence of other flaps, and end closures at each end of said carton structure, said end closures comprising, in sequence,

a. an infolded pair of side end flaps in closure position at 90° angles to said side panels,

b. an infolded bottom end flap in face contacting relationship with said side end flaps,

c. infolded sides areas of said overwrap extensions in face contacting relationship with said bottom end flap,

d. an infolded top end flap with the adhered position of the overwrap extension, and

e. an infolded bottom portion of the overwrap extension.

4,005,815

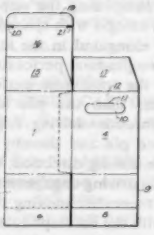
CARTON WITH SELF-CONTAINED REINFORCED HANDLE

Robert W. Nerenberg, Middletown, and Frank B. Herzog, Cincinnati, both of Ohio, assignors to The Interstate Folding Box Company, Middletown, Ohio

Filed Feb. 19, 1976, Ser. No. 659,375

Int. Cl.² B65D *5/46*, *25/28*

U.S. Cl. 229—52 B **7 Claims**



1. In a one-piece paperboard carton having four enclosing body walls and end closures at the opposite ends of said body walls, a hand hole defining tab formed in a first of said body wall spaced downwardly from the upper edge thereof to define

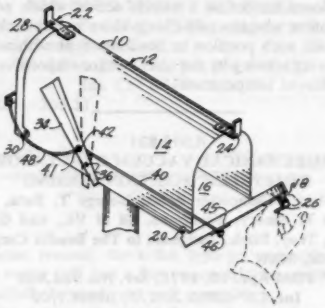
a handle portion therebetween, said tab being hingedly connected to said first body wall along a line of articulation defining the upper side edge of said tab, the top closure of said carton comprising a pair of flap members hingedly connected to the upper edges of the body walls adjacent said first body wall and a full width closure flap hingedly connected to the upper edge of the carton body wall opposite said first body wall, a tuck extension on the outermost side edge of said full width closure flap, said tuck extension having a width substantially equal to the width of the handle defining portion of said first body wall, whereby when said full width flap is fully closed and the tuck extension juxtaposed to the inner surface of said first body wall, said tuck extension will reinforce the handle defining portion thereof, said tab being foldable inwardly and upwardly to contact the inner surface of said tuck extension to provide further reinforcement for said handle defining portion, and releasable locking means for maintaining said full width closure flap and said tuck extension in their fully closed position.

4,005,816

MAILBOX HAVING DUAL ACCESS CLOSURES AND SIGNAL MEANS

Joseph M. Malik, 818 S. Big A Road, Toccoa, Ga. 30577

Filed May 12, 1976, Ser. No. 685,765
Int. Cl.² B65D *91/00*
U.S. Cl. 232—35 **14 Claims**



1. In a mailbox construction: an elongated mailbox housing, a front closure movably mounted on one end of said housing for depositing articles therein, a rear, closure movably mounted on the other end of said housing for removing articles placed in said mailbox, a signal device on said mailbox movable from a non-signalling position to a signalling position, and means connected to said front closure for moving said signal means from a non-signaling to a signaling position upon movement of said front closure and other means connected to said second closure for returning said signal means to non-signaling position upon the opening of said second closure.

4,005,817

NOZZLE TYPE CENTRIFUGE

Andrew Paul Charlton, Stamford; Kenneth Dan Lewis, Wilton; Charles Arthur Willus, Bethel, and Per Nyrop, Norwalk, all of Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

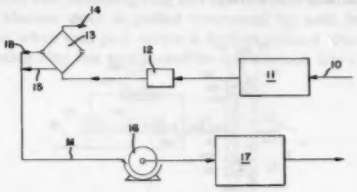
Filed Sept. 18, 1975, Ser. No. 614,565
Int. Cl.² B04B *1/12, 11/08*
U.S. Cl. 233—22 **24 Claims**

1. A nozzle type centrifugal machine with a vertical axis of rotation, operable for effecting the separation of a feed mixture into a light and a heavy fraction and a nozzle discharge product, comprising

a rotor having an upper open end, and a rotor shaft extending upwardly through said upper end, said rotor constructed and arranged for delivery of a light fraction from said upper end, and for overflow discharge of a heavy fraction at the lower end, and provided with nozzles spaced along the periphery intermediate said upper and lower ends for delivery of a nozzle product, and furthermore having a bottom feed opening for the introduction of said feed mixture into the rotor centrally from below,

a stationary housing surrounding said rotor, having a top opening, separate means for separately collecting and discharging said heavy fraction overflow and the nozzle discharge product respectively, and a supply connection at the bottom for introducing said feed mixture upwardly into said bottom feed opening of the rotor,

and a light fraction take off scoop device comprising a take off conduit member extending through said top opening of the housing into said rotor, and formed with a lateral scoop portion at the lower end, arranged for skimming off



an inner layer of said light fraction, while allowing the kinetic energy resulting from angular velocity to push such skimmed off light fraction material upwardly through said conduit member to discharge,

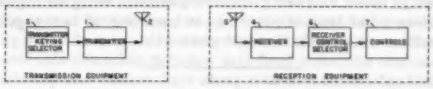
an elongate slide block fixed to the intermediate portion of said take off conduit member, and slidable longitudinally atop said housing, each end portion of said slide block having a longitudinally elongate vertical guide opening, a pair of upright bolts extending upwardly from said housing through respective elongate guide openings in guiding relationship therewith incident to longitudinal sliding movement of said block, said bolts having head portions preventing upward displacement of said block, said conduit member being unitary with said block thus being movable bodily on said housing parallel to itself in a horizontal plane, for adjustment of the skimming position of said scoop portion relative to said light fraction.

4,005,818

PULSE SIGNALING SYSTEM

Ernst H. Krause, and Claud E. Cleeton, c/o Naval Research Laboratory, Anacostia Station, Washington, D.C. 20020

Filed May 11, 1945, Ser. No. 593,174
Int. Cl.² H04B *1/00*
U.S. Cl. 325—38 R **6 Claims**



1. A radio pulse signalling system comprising, in combination:

means for generating a first time base consisting of a finite number of regularly time-spaced pulse signals;

first means for forming a pulse code group from said time base signal in accordance with a preselected pattern, said pulse code group always including an initial starting pulse;

means for transmitting a pulsed radio wave corresponding to said pulse code group;

means for receiving said pulsed radio wave at a remote point;

means, actuated by the initial starting pulse in said received wave, for generating a second time base corresponding to said first time base; and

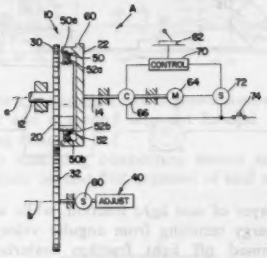
second means for forming a pulse code group corresponding to the transmitted pulse code group from said second time base signal.

4,005,819

MAGNETIC RETURN MECHANISM

Richard A. DeLille, East Moline, Ill.; William A. Curnan, Eldridge, Iowa, and Gentiel M. DeGryse, East Moline, Ill., assignors to Gulf & Western Industries, Inc., New York, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,512
Int. Cl.² G06C *15/42*
U.S. Cl. 235—144 ME **9 Claims**



1. In a counting device including a means for driving a member about a given axis and from a selected angular position; means for indicating when said member has been driven a given angular amount corresponding to a counting cycle; means for releasing said member for free rotation about said given axis back to said selected angular position; and return means for rotating said member from a position angularly spaced from said selected position to said selected position; said return means including a first set of permanent magnets, means for supporting said first set of magnets on said member, a second set of permanent magnets, means for supporting said second set of magnets in a generally fixed position to create a magnetic return force on said first set of magnets and a magnetic reaction force on said second set of magnets, said forces combining to return magnetically said member to said selected position when said member is spaced from said selected position and is free to rotate, the improvement comprising: each of said magnets having a given normal position with respect to its supporting means, shifting means for allowing a preselected substantial amount of movement from its normal position of at least one of said magnets in said first and second sets of magnets in response to one of said magnetic forces, said allowed movement being generally arcuate of said given axis and with respect to the supporting means of the magnet allowed to move, and said preselected amount being an angular distance of at least about 3° in at least one of two angular directions with respect to said given axis.

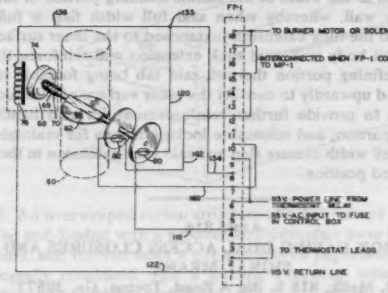
4,005,820

FURNACE APPARATUS AND PROCESS FOR CONTROL THEREOF

Howard D. Cress, New Haven, Ind., assignor to Wm. E. Burford, New Haven, Ind., a part interest

Filed May 21, 1975, Ser. No. 579,384
Int. Cl.² F23N *3/00*
U.S. Cl. 236—1 G **9 Claims**

1. In a process for controlling the heat losses in a heating system, the steps comprising monitoring the temperature within a given area with a temperature responsive element, communicating to a check valve within an exhaust stack below demanded temperature conditions to effect opening of such check valve to a position preliminary to operating a burner switch energizing a burner within a furnace to develop temperature to a preferred level, thereafter maintaining the burning until the temperature reaches a preferred value and is sensed by said temperature responsive element to effect an unswitching action which terminates burner operation, and then communicating to a check valve motor through a time


TO BURNER MOTOR OR SOLENOID VALVE
INTERCONNECTED WHEN FP-1 CONNECTED TO MP-1
115V. POWER LINE FROM
115 V. AC INPUT TO FUSE IN CONTROL BOX
TO THERMOSTAT LEADS
115 V. RETURN LINE

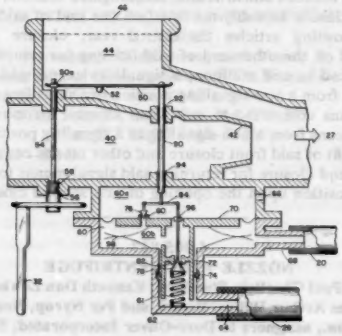
delay device, said check valve including two oppositely acting position responsive switch means, each operatively associated with said check valve to effect closing of said valve after a predetermined time to a closed position and wherein said valve is closed to define a switch action which actuates a control system wherein said check valve remains closed and will maintain such position to conserve heat within said furnace following sensing by the temperature responsive element of the preferred temperature.

4,005,821

THERMOMECHANICAL VACUUM REGULATOR USING BIMETALLIC POSITION SENSING

Michael Slavin, Gloucester Point; George T. Bata, Grafton; Raymen F. Emery, Yorktown, all of Va., and George C. Ludwig, Troy, Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Apr. 10, 1975, Ser. No. 566,869
Int. Cl.² G05D *23/275*; B60H *1/02*
U.S. Cl. 236—87 **14 Claims**



1. A vacuum regulator for producing a controlled vacuum related to the deviation of an actual temperature from a selected temperature comprising:

a source of vacuum;

a first pressure source;

a chamber, the vacuum within which comprises said controlled vacuum;

first valve means for communicating said chamber with said pressure source when open;

second valve means for communicating said chamber with said source of vacuum when open;

a beam having at least three approximately colinear spaced apart pivots, said first valve means cooperating with said beam at a first pivot and said second valve means cooperating with said beam at a second pivot to open and close said valve means, said beam having an equilibrium condition wherein said first and second valve means are closed;

bimetal means responsive to temperatures higher than said selected temperature and cooperating with said beam at a third pivot for urging said beam into a second condition to open one of said valve means while maintaining the other of said valve means closed, and responsive to temperatures lower than said selected temperature for urging said beam into a third condition to open the other of said valve means while maintaining said one of said valve means closed; and,

a vacuum feedback diaphragm means comprising at least a portion of at least one of said first and second valve means and responsive to pressure difference thereacross for displacing said diaphragm means and cooperating through at least one of said first and second valve means with said beam to return to said equilibrium condition, one side of said diaphragm means being communicated with said chamber and the other side of said diaphragm means being communicated with a second pressure source.

4,005,822

FAN DUCT THRUST REVERSER

Richard H. Timms, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Dec. 22, 1975, Ser. No. 643,492
Int. Cl.² B64C *15/06*
U.S. Cl. 239—265.31 **4 Claims**

1. A thrust reverser for a fan type jet propulsion engine having an outer wall and a fan concentric therewith and extending radially beyond said wall comprising:

a cowling surrounding said fan and extending coaxially along the central axis of said engine in a spaced relationship from said engine outer wall to form a bypass duct, said cowling being separated into forward and downstream portions, said downstream portion translatable rearward to form a gap spacing in said cowling between said portions;

a translatable sleeve with selected openings peripherally disposed therethrough, said openings having cascades therein;

a plurality of blocker doors adjacent said cascades pivotably secured to said downstream portions and rotatably about the forward edge thereof, said doors arranged to rotate into said bypass duct thereby blocking flow through said duct and diverting said flow through said cascades; and

translating means supported by said portions and disposed within said cowling for translating said aft portion, said sleeve portion and rotating said doors during the terminal motion of said downstream portion, whereby said cascades are positioned in said gap before said doors divert flow from said duct;

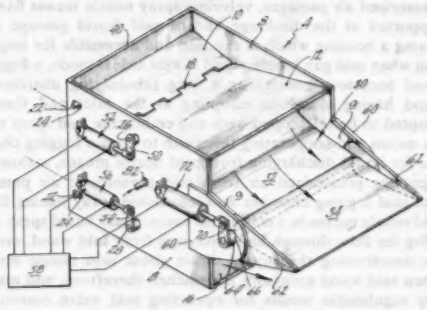
said translating means comprising a plurality of rotating drive means, each of said drive means driving a tube member having longitudinal splineways therein, a jack screw having splines at one end thereof for engaging said splineways, said jack screw translatable longitudinally within said tube member by rotation of said tube member, a first and second threaded nut engaging said jack screw, said first threaded nut fixedly attached to said forward portion for movement of said jack screw by rotation of said drive means, a thrust bearing member positioned intermediate the ends of said jack screw for translation therewith, a track member attached to said thrust bearing for movement therewith, said track member having an inverted U shape, the outer parallel side surfaces of said track member being fixedly attached to said translatable sleeve, the inner parallel sides of said track member having longitudinal cut outs therealong for engaging roller means positioned on said threaded nuts for relative movement therewith, the outer upper surface of said track member having slidable engagement with and supporting said downstream portion, an actuating ring carried by and translatable in a downstream direction by said translatable sleeve and in a forward direction by said second threaded nut, stop means positioned on said track member for terminating the rearward movement of said actuating means and linkage means pivotally attached between said actuating ring and said blocker door so that said blocker door is pulled downward by said linkage means when said jack screw is further rotated after said actuating ring has terminated its downstream travel.

4,005,823

FLAP-TYPE TWO-DIMENSIONAL NOZZLE HAVING A PLUG

Edward B. Thayer, Hobe Sound, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sept. 30, 1975, Ser. No. 618,093
Int. Cl.² B64C *9/38*
U.S. Cl. 239—265.37 **9 Claims**



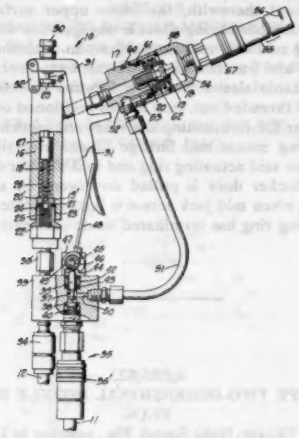
1. A flap-type two-dimensional plug nozzle having a rectangular inlet, fixed sides extending rearwardly from each side of said inlet, a pivotally mounted top flap, said pivotally mounted top flap being pivotally mounted between its ends about a first fixed pivotal axis extending between said fixed sides, a pivotally mounted bottom flap, said pivotally mounted bottom flap being pivotally mounted between its ends about a second fixed pivotal axis extending between said fixed sides, the rear ends of said top and bottom flaps along with said fixed sides forming the exit area, plug means centered between said pivotally mounted top flap and said pivotally mounted bottom flap, a first throat plane being formed between said plug means and said top flap, a second throat plane being formed between said plug means and said bottom flap, said top flap forming a convergent-divergent passage with said plug means, said bottom flap forming a convergent-divergent passage with said plug means, said first and second throat planes being located downstream of said first and second pivotal axes, respectively, to provide an increase in nozzle area ratio as throat area at the throat plane increases.

4,005,824

SPRAY GUN QUICKLY CONVERTIBLE BETWEEN AIR AND AIRLESS OPERATING MODES

Robert D. Becker, Arcadia, and Freddie S. Kaderka, Covina, both of Calif., assignors to Grover Smith Mfg. Co., Montebello, Calif.

Filed Aug. 21, 1975, Ser. No. 606,653
Int. Cl.² B05B *15/10*
U.S. Cl. 239—289 **18 Claims**



1. A liquid spray gun quickly convertible for use selectively in an air mode with a spray distributing wand and in an airless non-fogging mode, said spray gun comprising: a hollow main body having separate valve-controlled pressurized liquid and pressurized air passages, valveless spray nozzle means fixedly supported at the discharge end of said liquid passage and having a housing which is exposed and accessible for inspection when said gun is being used in said airless mode, a fogging wand accessory comprising a long tubular fog distributing wand having a tubular coupling at the inlet end thereof adapted to be telescoped over and embracing said spray nozzle means and cooperating therewith to form a fogging chamber for liquid discharging from said nozzle means, means for supplying pressurized air from said pressurized air passage into said fogging chamber and into liquid spray issuing from said nozzle means in a manner to convert said liquid spray into a fog for flow through and discharge from said wand, means for deactivating the supply of air about said nozzle means when said wand accessory is detached therefrom, and manually regulatable means for operating said valve controlled liquid and air passages to supply properly proportioned pressurized liquid to said nozzle and pressurized air to said fogging chamber when said fogging wand accessory is assembled over said nozzle means.

4,005,825

MIXING MANIFOLD FOR AIR ATOMIZING SPRAY APPARATUS

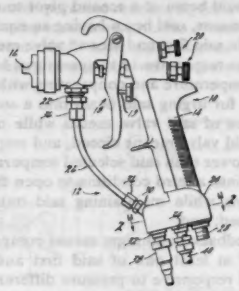
Duane C. Schowiak, Farmington Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 525,596, Nov. 20, 1974, Pat. No. 3,924,806. This application Nov. 24, 1975, Ser. No. 634,971
Int. Cl.² B05B *7/12, 7/04*
U.S. Cl. 239—413 **7 Claims**

1. Apparatus for mixing the components of a multiple component sprayable fluid, attachable to an air atomizing spray gun of the type having a spray nozzle, an air passage communicating with the spray nozzle and arranged for communication with a source of pressurized gas and a sprayable fluid passage communicating with the air passage, comprising in combination:

a manifold member having a through passage and means for attachment to the air passage inlet to place said through passage in fluid tight communication with the air passage;

passage means extending through said manifold and having at least three fluid ports;



at least two of said manifold passage ports being adapted for fluid communication with separate reservoirs of the components of the sprayable fluid; and

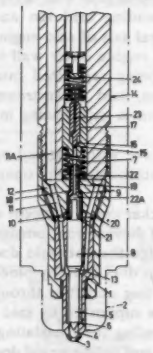
a static mixer means intercommunicating one of said fluid ports and the spray gun sprayable fluid passage port operative to intimately intermix the components of the sprayable fluid.

4,005,826

INJECTORS FOR THE FUEL INJECTION SYSTEMS OF INTERNAL COMBUSTION ENGINES

Henry Edwin Woodward, Bourne End, England, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 368,991, June 11, 1973, abandoned. This application Jan. 16, 1975, Ser. No. 541,501
Claims priority, application United Kingdom, June 12, 1972, 27449/72
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976
Int. Cl.² B05B *1/30*
U.S. Cl. 239—533.8 **9 Claims**



1. An injector including a fuel supply passage for a fuel injection system of an internal combustion engine which comprises:

a. a nozzle body formed with a compartment and including a valve seat;

b. a nozzle needle positioned within said compartment of said nozzle body and cooperating with said valve seat to form an injection valve;

c. guide means for guiding said nozzle needle within said nozzle body, one end of said guide means forming a first

chamber including part at least of said compartment, the other end of said guide means forming a second chamber within said injector, said first and second chambers being in fluid communication with said fuel supply passage, the cross-sectional area bounded by the other edge of contact between said nozzle needle and said valve seat being smaller than the cross-sectional area of said guide means;

d. spring means for biasing said nozzle needle against said valve seat; and

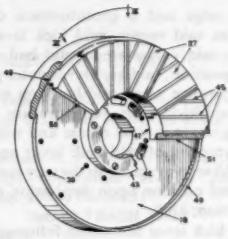
e. trigger valve means for opening said second chamber at a first predetermined pressure within said second chamber and for closing said second chamber at a second lower predetermined pressure within said second chamber whereby (i) an increase in fuel supply pressure causes said trigger valve means to open when the pressure in said second chamber reaches a value substantially equal to or greater than said first predetermined pressure, thereby relieving the pressure in said second chamber so that the resultant force on said nozzle needle causes the nozzle needle to lift from said valve seat for the injection of fuel and (ii) said trigger valve means recloses said second chamber when the pressure in said second chamber reduces to a value substantially equal to or lower than said second predetermined pressure, said nozzle needle being returned into contact with said valve seat under the influence of said spring means.

4,005,827

REFINER DISK

William J. Frair, Pittsfield, and Robert P. Langdon, Savoy, both of Mass., assignors to Beloit Corporation, Beloit, Wis.

Filed Apr. 30, 1975, Ser. No. 572,970
Int. Cl.² B02C 7/12
U.S. Cl. 241—261.3 13 Claims



1. A plurality of disk shaped segments for refining material within a refiner,

said segments being arranged in an annular array within said refiner,

said segments having inner and outer peripheral edges connected by two opposed side edges,

each of said side edges having offset portions thereon,

each of the adjacent segments being positioned within said refiner so that said offset portions of one of said side edges cooperates with the offset portions of the adjacent side edge in an overlapping and spaced apart relation.

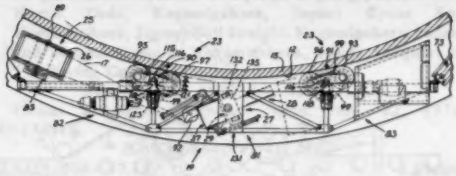
4,005,828

METHOD AND APPARATUS FOR STRESSING A TENDON AND BANDING A STRUCTURE

Endre F. Peszeszer, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed May 6, 1975, Ser. No. 574,900
Int. Cl.² B21F 17/00, 45/00
U.S. Cl. 242—7.21 35 Claims

1. An apparatus for applying a circumferential prestressing tendon to a structure comprising a carriage movable about the peripheral wall of the structure, tendon tensioning means on said carriage for tensioning and paying out the tendon to the wall as said carriage travels in a forward direction, traction drive means for engaging the peripheral wall of the structure and for driving said carriage in a forward direction, restraining means connected to said carriage to form a band about said structure and applying to said carriage a force urging said



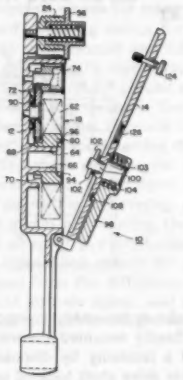
traction drive means against the wall of the structure, said traction drive means comprising a plurality of hydraulic motors having a rotatable portion thereon, and an annular tire means mounted on each of said rotatable portions for engaging the wall and for acting as traction wheels for driving said carriage while tensioning said tendon.

4,005,829

TAPE ROLL AND CORE

Walter R. Wise, Pittsford; Ellsworth J. Allen, Newark, and Donald K. Fisher, Palmyra, all of N.Y., assignors to Garlock Inc., Palmyra, N.Y.

Division of Ser. No. 402,482, Oct. 1, 1973, abandoned. This application May 21, 1975, Ser. No. 579,473
Int. Cl.² B65H 17/02, 81/00
U.S. Cl. 242—68.5 21 Claims



1. A tape roll including a core and a length of tape wound on said core, said core having a length greater than the width of the tape and drive means on the external surface of said core not covered by said tape and including a plurality of grooves in an end surface of said core.

4,005,830

MANDRELLESS DOWNCOILER FOR COIL BOX

William Smith, Burlington, Canada, assignor to The Steel Company of Canada, Limited, Hamilton, Canada

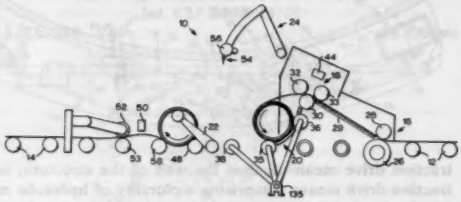
Filed May 6, 1975, Ser. No. 574,901
Claims priority, application United Kingdom, May 6, 1974, 19917
Int. Cl.² B21C 47/08, 47/22
U.S. Cl. 242—78.1 16 Claims

1. In combination:

coiling means for a transfer bar, including bend rollers adapted to curl the transfer bar and first cradle rolls on which the transfer bar can be supported as it coils itself into a coil with an open center core,

second cradle rolls adjacent the first cradle rolls, the second rolls being adapted to receive a coil for uncoiling,

and transfer means for transferring a coil from said first cradle rolls to said second cradle rolls, said transfer means including a pair of spaced-apart transfer arms coaxially pivoted at a position between the first cradle



rolls and the second cradle rolls, each transfer arm having a stub mandrel and being movable toward and away from the other transfer arm, the stub mandrels being adapted to enter the open center core of a coil from opposite sides, and means for pivoting the transfer arms in tandem to swing the coil from said first cradle rolls to said second cradle rolls.

4,005,831

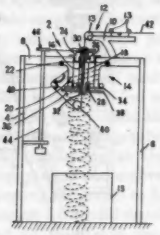
WIRE TAKE-UP ASSEMBLY

Indrajit Chaliha, 5 Mission Row, Calcutta - 1, West Bengal, India

Filed Nov. 3, 1975, Ser. No. 628,239

Int. Cl.² B21C *47/00*

U.S. Cl. 242—82 **6 Claims**



1. A wire take-up assembly comprising a frame provided with a block fixedly mounted thereto, said block having an open end and a retaining lip disposed at said open end, a hollow rotatable drive shaft located coaxially with respect to said block and formed with a bore, guide means for enabling a wire to be drawn through the bore of said rotatable shaft on to said block, and lead-off means for enabling the drawn wire to be led away helically.

4,005,832

STRUCTURE RELATING TO BAIL ARM OF SPINNING REEL FOR FISHING

Tatsuya Yamazaki, Fuchu, Japan, assignor to Ryobi, Ltd., Fuchu, Japan

Filed July 14, 1975, Ser. No. 595,854

Claims priority, application Japan, Sept. 9, 1974, 49-108979[U]

Int. Cl.² A01K *89/02*

U.S. Cl. 242—84.21 R **3 Claims**

1. A spinning reel for fishing having a body and a rotor with a bail arm structure comprising:

a bail arm;

a bail arm cam and an arm supporting plate supporting respective upper and lower ends of said bail arm on the peripheral wall of said rotor, said cam and plate being mounted on opposite sides of the peripheral wall of said rotor;

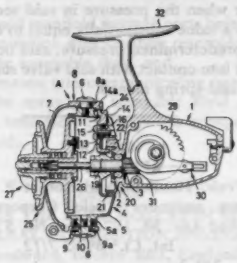
a first spring coupled between said rotor and one end of said bail arm and applying a torque to force said bail arm to move toward a folded position adjacent the body of the spinning reel;

means defining an opening formed in the peripheral wall of said rotor under said bail arm cam, said bail arm cam having a cam surface facing inwardly of said rotor;

a kick lever having a longitudinally elongated slot in its main body and a fastener extending through said slot and connected to said rotor;

said slot and fastener slidably supporting said kick lever on said rotor, said kick lever having its outer end extending through said opening and having a butting portion at the upper end of said kick lever and an operating button portion at its outer end;

a second spring urging said end of said kick lever to project outwardly through said opening and against the cam face of said bail arm cam, said cam face having a recess at its



peripheral edge and a protuberance circumferentially spaced from said recess, said kick lever outer portion latching in said recess when said bail arm is in a line detaching position, said kick lever outer portion engaging said protuberance when said bail arm is in an operating position, said kick lever outer portion being releasable from engagement in said recess and with said protuberance by actuation of said kick lever against the biasing force of said second spring to thereby return said bail arm to the folded position upon depression of said operating button portion; and

wherein said kick lever has a cam follower portion extending sideways from the lower end thereof and engageable with a release cam on the body of the spinning reel, said cam follower engaging said release cam on the main body of the spinning reel to thereby effect movement of said kick lever against the bias of said second spring sufficient to release said outer end portion from said recess and thus effect movement of said bail arm from said line detaching position to said operating position.

4,005,833

YARN TENSIONING DEVICE

Otto Zollinger, 120 Pine Acres Drive, Spartanburg, S.C. 29301

Filed Sept. 11, 1975, Ser. No. 612,379

Int. Cl.² B65H *59/30*

U.S. Cl. 242—152.1 **8 Claims**

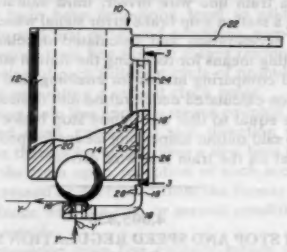
1. A yarn tensioning device of the seated-ball type, comprising:

an elongate ball receiving member having a bore extending completely therethrough and opening from opposite ends thereof;

means connected to said elongate member for mounting the same in a generally upright position with one end thereof lowermost;

an annular ball seating member disposed beneath said one end of said elongate member in vertically spaced and axially-aligned relationship to said bore thereof;

a ball element supported upon said seating member for in conjunction therewith imposing a tensioning force upon a running yarn passing during operation of said device first upwardly through said seating member and then laterally outwardly from between said seating member and said ball element below said one end of said elongate member; said ball element projecting upwardly from said seating member into said bore of said elongate member and being thereby constrained from excessive lateral displacement



relative to said seating member during operation of said device;

said elongate member having a length sufficient to receive therein, when desired, a plurality of additional ball elements in superimposed relationship to said ball element supported by said seating member;

and adjustable interconnecting means interconnecting said seating member and said elongate member for adjustment of the vertical spacing between said members.

4,005,834

WINDING CABLES AND THE LIKE ON TO STORAGE DRUMS

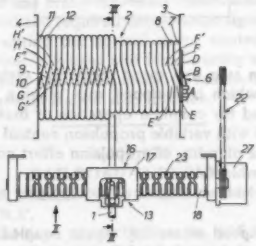
Jean Florent François Marcel Robert Landreau, Auzay, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed June 9, 1975, Ser. No. 584,856

Claims priority, application France, June 11, 1974, 74.20111; Oct. 28, 1974, 74.36031

Int. Cl.² B65H *57/28*

U.S. Cl. 242—158.3 **8 Claims**



1. A device for winding a cable onto a rotating drum, comprising a cable guide member, and control means comprising a cylinder having a guide track formed in the peripheral surface thereof, said guide track having portions of circular arc form connected by short oblique portions, means mounting the cylinder rotatably, means for rotating the cylinder at a speed proportional to the speed of rotation of the drum, a power operated reader having a reading head carrying a feeler engaging the guide track and compelled to follow the same, means for driving the cable guide member, and means for actuation of the driving means from the reading head.

4,005,835

AUTOMATIC FLIGHT CONTROL MEANS FOR ROTARY WING AIRCRAFT HAVING ATTITUDE-AIR SPEED CONTROL

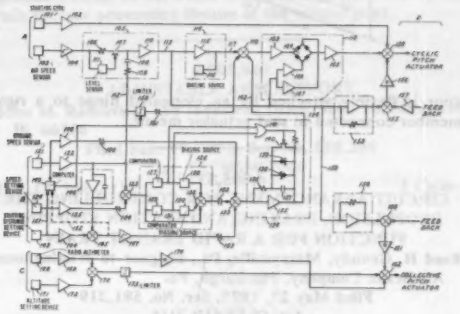
Milton I. Gerstine, Wilmington, Del.; Joshua I. Goldberg, Ridgefield, Conn.; Setsuo Futatsugi, Kogamigahara, Japan; Kazuo Ueda, Kogamigahara, Japan; Ryozo Seo, Kogamigahara, Japan; Koji Iwasaki, Kogamigahara, Japan, and Makoto Uemura, Kogamigahara, Japan, assignors to The Boeing Company, Seattle, Wash.

Filed Nov. 24, 1975, Ser. No. 634,383

Claims priority, application Japan, Nov. 22, 1974, 49-134515

Int. Cl.² B64C *11/44, 27/70*

U.S. Cl. 244—17.13 **2 Claims**



1. Automatic flight control means for rotary wing aircraft comprising ground speed detecting means for detecting the ground speed of a rotary wing aircraft and difference signal generating means for generating a signal representing the difference between a set speed and the ground speed obtained from said ground speed detecting means so that flight control is performed by the difference signal, characterized in that the control means comprises means for detecting the air speed of the aircraft and generating an air speed signal, biasing means for adding to said air speed signal, a bias signal corresponding to the attitude of the aircraft in a hovering condition and generating a trim value signal representing the attitude in a balanced relation to the air speed at every instance, means for generating an attitude signal, and means for generating an attitude/speed error signal from the difference between said trim value signal and said attitude signal, said attitude/speed error signal being utilized to control a flight condition.

4,005,836

TARGET THRUST REVERSER

Henry Mutch, Chula Vista, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

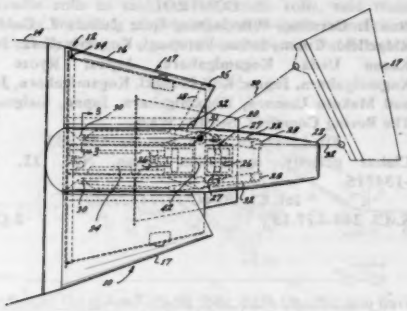
Filed Dec. 22, 1975, Ser. No. 643,493

Int. Cl.² B64C *15/04;* **B63H** *11/10*

U.S. Cl. 244—110 B **3 Claims**

1. A thrust reversal system for an aircraft jet engine enclosed in a nacelle having an aerodynamic profile comprising, a thrust reverser door formed of thin flexible sheet material moveable between a stowed and a deployed position and

actuator means for moving said thrust reverser door between said positions, each longitudinal edge of said thrust reverser



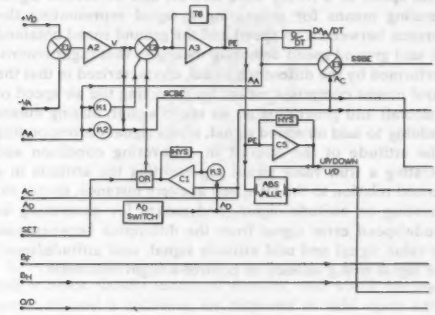
door is flexibly attached by an elongated hinge to a rigid member connected to said actuator means.

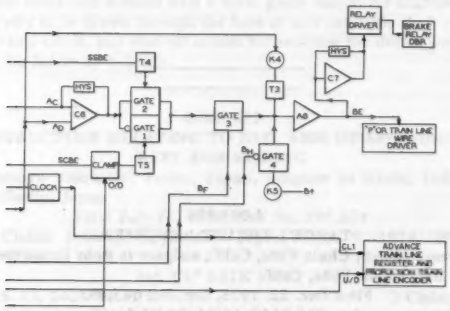
4,005,837

CIRCUIT ARRANGEMENT FOR CONTROLLING THE PROPULSION, BRAKING AND STATION STOPPING FUNCTION FOR A RAPID TRANSIT TRAIN

Reed H. Grundy, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed May 27, 1975, Ser. No. 581,219
Int. Cl.² B61L *3/16*
U.S. Cl. 246—182 B **10 Claims**





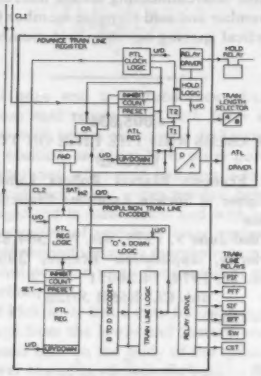
1. A circuit arrangement for controlling the propulsion, braking, and station stopping function for a rapid transit train comprising, a first summing and amplifying means for producing a velocity signal which is a function of the desired and actual velocity of the train, a second summing and amplifying means for producing a propulsion error signal which is a function of the velocity signal and an actual acceleration signal, an absolute value and sign determining means for receiving the propulsion error signal and for producing an up-down signal and for producing an analog signal which is supplied to a clock for generating pulses, means for producing a speed control braking error signal which is a function of the velocity signal and an actual acceleration signal, first gate means for applying the speed control braking error signal to an output amplifying means which provides a brake error signal to a train line wire driver, third summing means for producing a station stop brake error signal which is a function of actual acceleration and calculated deceleration signals, second gating means for receiving the station stop brake error signal, and comparing means for enabling said second gating means when calculated deceleration and desired acceleration signals are equal so that the station stop brake error signal is applied to said output amplifying means for providing a brake error signal on the train line wire driver.

4,005,838

STATION STOP AND SPEED REGULATION SYSTEM FOR TRAINS

Reed H. Grundy, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed May 27, 1975, Ser. No. 581,369
Int. Cl.² B61L *3/08*
U.S. Cl. 246—182 B **7 Claims**



1. A station stop and speed regulation system for a train, each car of which is equipped with braking control means interconnected for common operation of brakes throughout the train, and with variable propulsion control means capable of providing a plurality of propulsion effort conditions, comprising in combination,

a. a desired velocity source for supplying a desired speed signal,

b. a train speed measuring means coupled for measuring velocity of the train and for generating separate signals representing actual train speed and actual train acceleration,

i. said measuring means also supplying pulses, each representing a unit of distance traveled by that train,

c. a speed and brake regulating means coupled for receiving said desired speed, actual speed, and actual acceleration signals, and responsive to the difference between said desired and actual speed signals for generating a series of first clock pulses in accordance with the magnitude of said difference and an error direction signal having a first or a second condition as said actual speed is less than or more than said desired speed, respectively,

i. said speed and brake regulating means further responsive to said difference for generating a brake error signal to jointly actuate said braking control means, said brake error signal normally inhibited from execution while a propulsion effort exists,

d. an advance train line register means connected for receiving said series of first clock pulses and said direction signal and responsive thereto for varying the propulsion level of the train by preselected steps including a preselected number of cars less than the total cars in the train, one step for each clock pulse, increasing or decreasing from the train base propulsion level as said direction signal is in said first or second condition, respectively,

i. said advance train line register means responsive to the completion of each full train cycle of propulsion variation for generating a second clock pulse,

e. a propulsion train line encoder means coupled for receiving second clock pulses and said direction signal and responsive thereto for establishing a new base propulsion level for the train upon reception of each second clock pulse, increased or decreased from the former base level in accordance with the first or second condition of said direction signal,

i. said propulsion train line encoder means connected, when in its zero count condition during a count-down action, for removing the inhibiting clamp on said braking error signal to actuate a train braking action and for resetting said advance train line register means,

f. a trigger detection means responsive to passage by a station stop actuating device, positioned along the track wayside a predetermined distance in approach to a station stop location, for registering a station stop trigger signal,

g. an acceleration computer means, connected to said trigger detection means and to said speed measuring means, responsive to said trigger signal, said distance traveled pulses, and actual train speed signal for computing a signal representing the deceleration rate required to stop that train at said station stop location, and further coupled to supply the required deceleration signal to said speed and brake regulating means,

h. a source of a desired acceleration/deceleration rate signal, coupled to supply that signal to said speed and brake regulating means,

i. said speed and brake regulating means responsive to said desired deceleration signal and said required deceleration signal in a preset ratio for driving said propulsion train line encoder means to the lowest propulsion level for that train,

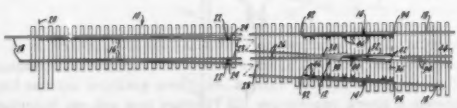
j. said speed and brake regulating means also responsive to said desired and required deceleration signals when equal for interrupting the normal speed control of the train braking control means and for actuating a train braking action at said desired deceleration rate until that train has stopped at said station stop location.

4,005,839

RAILROAD TURNOUTS

Earl E. Frank, Tallman, N.Y., assignor to Abex Corporation, New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,390
Int. Cl.² E01B 7/14
U.S. Cl. 246—415 R **8 Claims**



1. In a railroad turnout comprising a switch having a pair of switch point rails which extend from switch points at one extremity to a heel spread at the other extremity where they are attached to a pair of closure rails for diverting traffic from one set of main stock rails to another, all the rails having a wide base joined to a head by an intermediate web, and in which the switch has a heel spread downstream of the switch points defined by a heel block interposed between each switch point rail and the adjacent stock rail, the improvement comprising welded joints between the switch point rails and closure rails downstream of the heel spread of the switch characterized in that between the heel spread and welded joints the bases of the switch point rails repose on runoff plates having stop lugs spaced laterally a greater distance than the lateral dimension of the base of the switch point rails, said distance being sufficient to allow full flexure of the switch point rails beyond the heel spread providing easier movement of the switch point rails when throwing the switch, and further characterized in that the spacing between the stop lugs of each runoff plate immediately upstream of the welded joints is generally equal to the width of the base of the switch point rails thereby preventing flexure at the welded joint.

4,005,840

ADJUSTABLE ARM SUPPORT

John M. Ratkovich, 188 Industrial Drive, Suite 16, Elmhurst, Ill. 60126

Filed Feb. 17, 1976, Ser. No. 658,289
Int. Cl.² B68G 5/00
U.S. Cl. 248—118 **3 Claims**

1. A leg-to-arm support comprising two long strips pivoted centrally together at a predetermined axis to define four extending positions;

two pairs of shorter strips of a length less than one-half the length of the longer strips, the members of each pair being terminally pivoted to each other on axes spaced vertically from each other,

the three axes being parallel and spaced in a straight line with respect to one another;

means for pivotally mounting the remote end of each of said two pairs of shorter strips to the four portions of said longer strips intermediate their remote ends for relative pivotal movement to provide oppositely facing vertically spaced pairs of cradles defined by converging ends of the longer and shorter strips defining obtuse angles at their pivotal engagement to support arms and legs resting thereon against lateral movement.

4,005,841

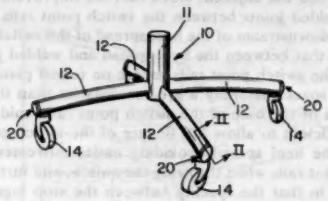
CHAIR BASE ARM END CAP

Thomas E. Rensland; Robert C. Clawson, and Alexander A. Karrip, all of Grand Rapids, Mich., assignors to Steelcase, Inc., Grand Rapids, Mich.

Filed Dec. 31, 1975, Ser. No. 645,517
Int. Cl.² F16M 11/20
U.S. Cl. 248—188.7 **15 Claims**

1. In an article of furniture having a first socket with an opening to be covered, the improvement comprising: said first socket including a detent member therein extending from an interior surface thereof; a cap including a cover portion for

covering the opening of said first socket and a plug portion extending from said cover portion; said plug extending into said first socket and over and beyond said detent member; said plug including a barb extending downwardly therefrom behind



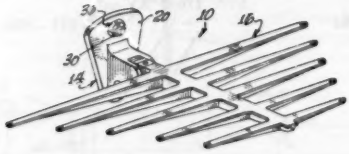
and adjacent said detent member; said barb being sufficiently flexible relative to said plug to allow it to slide over said detent member and being sufficiently resilient to slip down behind said detent member after it has slid over it, whereby insertion of said plug is facilitated whereas removal is not.

4,005,842

TWIST-OFF, BREAK-AWAY OPENING COVER

William B. Lane, West Covina, Calif., assignor to Deccofelt Corporation, Glendora, Calif.

Filed July 31, 1975, Ser. No. 600,569
Int. Cl.² A47B *96/06*
U.S. Cl. 248—200 **4 Claims**



1. A fixture for attachment to a mounting surface comprising:

a mounting base having a rear side for seating against said mounting surface, an opposite, normally exposed front side, and a hole to receive a fastener for securing the base to said surface;

a removable cap integrally formed at the front side of said base concealing said hole, said cap being shaped to simulate the head of a screw fastener having at least one closed recess formed therein to receive a screw driver;

said cap projects beyond the front side of said mounting base to simulate a fastener head seating against said front side; and

means releasably securing said cap to said base comprising an adhesive bonding material disposed on said rear side of said mounting base, whereby said base may be adhesively bonded to said mounting surface without exposing said hole by leaving said cap on the base, or the cap may be removed to permit attachment of the base to said mounting surface by insertion of a fastener through said hole.

4,005,843

HANGING DISPLAY ROTATOR

Sheldon M. Wengel, Reedsburg, Wis., assignor to Gerber Products Company, Fremont, Mich.

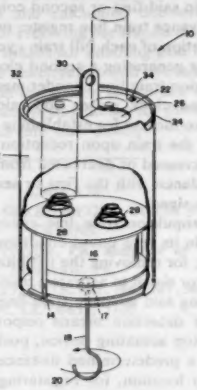
Filed Oct. 31, 1975, Ser. No. 627,815
Int. Cl.² G09F *11/00*
U.S. Cl. 248—220.2 **4 Claims**

1. A rotator for a hanging display having a self-contained power supply comprising:

a circular cylindrical body enclosing motor means having a shaft extending therefrom in axial orientation to said body, said shaft having hook means for hanging an object therefrom, said motor means being operative to rotate said shaft;

slot means defining an inwardly facing annulus along the inner wall of said body adjacent the end of said body opposite said motor means;

a rotatable, electrically conductive circular top plate with a rim slidably within said slot means, said top plate, cylindrical body and motor means comprising a battery chamber for enclosing batteries sidewise adjacent one another;



said top plate including an opening therein for the insertion or removal of batteries and further being operative to rotate with respect of said cylinder body to effect series electrical connection between sidewise adjacent batteries confronting said top plate actuating said motor means and to permit insertion and removal of batteries; and

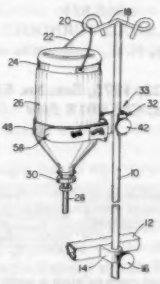
electrode spring means operative to establish electrical connection between batteries and terminals of said motor means for urging batteries into electrical contact with said top plate.

4,005,844

SOLUTION BOTTLE HOLDER

James W. Richmond, Comstock Township, Kalamazoo County, Mich., assignor to Stryker Corporation, Kalamazoo, Mich.

Filed Aug. 25, 1975, Ser. No. 607,202
Int. Cl.² B42F *13/00*
U.S. Cl. 248—311.3 **5 Claims**



1. An apparatus removably attachable to a wheeled patient carrier for supporting on said carrier a bottle of solution being

delivered to a patient, the bottle having a suspending element associated therein for permitting it to be suspended in an inverted position, the combination comprising:

an elongated rigid rodlike support member;

means releasably attaching said support member to the carrier in an upright position wherein said support member projects upwardly from the carrier;

hanger means fixed on the upper end of said elongated member

and engageable with said suspending element for suspending said bottle in an inverted position;

bracket means releasably secured to said elongated support member at a location spaced downwardly from said hanger means and being adjustable lengthwise of said support member, said bracket means including an angled bar having two flat plate-like parts which extend at an angle relative to one another and define a shallow V-shaped recess for receiving said bottle;

flexible strap means connected at one end to said bar adjacent an outer edge of one of said flat parts, said strap means being extendible around said bottle and connectible with said bar adjacent an outer edge of the other flat part whereby said bottle is held firmly within said V-shaped recess against said bar, said strap means being flat and having two sections connected end-to-end, said sections having coacting and interengageable fastening means on the same sides thereof; and

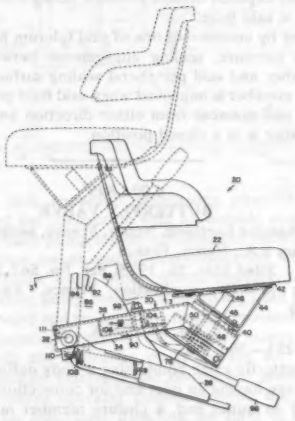
said bracket means having a slot in one end of said bar whereby said strap means may be passed through said slot and folded back onto itself to adjustably selectively engage said fastening means at various positions to maintain said bottle snugly against said bar.

4,005,845

SEAT ASSEMBLY INCLUDING A TURNAROUND-TYPE SEAT

Carlos Enrique Luppi; Marino Antonio Tavolini, and Juan Carlos Roberto Travaini, all of Rosario, Argentina, assignors to Deere & Company, Moline, Ill.

Filed Mar. 15, 1976, Ser. No. 667,165
Int. Cl.² F16M *13/00*
U.S. Cl. 248—419 **8 Claims**



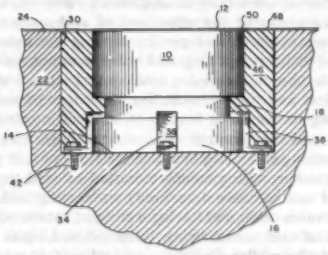
1. A turn-around seat assembly, comprising: a seat support mounted for vertical movement about a first axis between first and second working positions; a latch release lever pivotally mounted on the seat support for movement about a second axis between a normal lock position and a release position; a first latch element fixed to the lever for movement therewith between lock and release positions corresponding to the lock and release positions of the lever, said first latch element including a cam surface means; a member fixed adjacent to the seat support and defining latch surface means arranged for cooperating with the first latch element for releasably retaining the seat support in a selected one of its working positions when the lever is in its normal lock position; a seat mounted on the seat support for swivelling about a third axis between first and second working positions disposed 180° from each other and corresponding to the first and second working positions of the seat support; a second latch element carried by the seat and being movable toward and away from the seat support between lock and release positions; said seat support including second latch surface means arranged for cooperating with the second latch element for releasably retaining the seat in a selected one of its operating positions when the second latch element is in its lock position; and link means being engaged with said cam surface means and kinematically connected between the cam surface means and the second latch element for effecting movement of the second latch element to its release position in response to movement of the first latch element to its release position by the lever; and means biasing the link means against the cam surface means and normally acting to retain the lever in its lock position.

4,005,846

INGOT MOLD BASE MEMBER

Kenneth A. Gebler, Munster, Ind., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 19, 1975, Ser. No. 633,359
Int. Cl.³ B22D *7/06, 19/10*
U.S. Cl. 249—204 **5 Claims**



1. A method for preparing metal ingots comprising:

A. casting an iron base with a cavity within its top, said cavity having a bottom and a side running along its perimeter;

B. disposing a refractory insert with a side running along its perimeter within the insert cavity, said refractory insert of approximately the same shape as said cavity but of substantially less dimension thereby defining a hollow between the side of said cavity and the side of said insert, said refractory insert containing a groove in its side, said groove having a bottom surface positioned approximately parallel to the bottom surface of said refractory insert;

C. anchoring said refractory insert within said cavity with at least two Z-shaped anchors, said anchors having a top horizontal member, a vertical member and a bottom horizontal member, said anchors positioned with said top horizontal members is contact with said bottom face of said groove, with said vertical members contacting the edge of said insert and with said bottom horizontal members fastened to the bottom of said cavity; and,

D. substantially filling the hollow with a plastic refractory.

4,005,847

CONNECTION VALVE

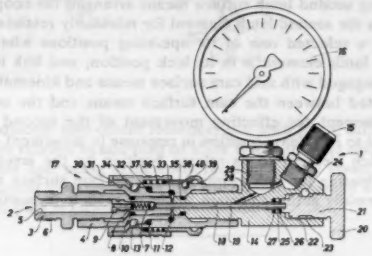
Bror Thure Fridolf Ekman, Slalamvagen 12, 54100 Skovde, Sweden

Continuation of Ser. No. 210,483, Dec. 21, 1971, abandoned. This application July 9, 1974, Ser. No. 486,753

Claims priority, application Sweden, Dec. 23, 1970, 17529/70

Int. Cl.² F16K *51/00*; F16L *29/00*

U.S. Cl. 251—148 **2 Claims**



1. Connection valve for the temporary connection of equipment to a conduit system for pressure fluids comprising at least one terminal valve attachable to the conduit system and having an axial bore, a check valve being positioned in said bore and having a normally closed spring pressed valve member capable of being opened only when said valve member is moved towards the conduit system, a control valve having an end portion detachably positioned and connected against said terminal valve and having a bore in line with said terminal valve bore, said control valve having a second bore extending on a slant from said first control valve bore, a pin slideably mounted along most of its length in said first control valve bore and extending from said control valve end portion into said terminal valve bore to said check valve member, adjustable means closing the other end of said control valve and being connected to said pin for moving the same longitudinally for at times opening said valve member, said pin being prismatic, the walls defining said control valve first bore being cylindrical and tightly encircling the edges of said prismatic pin along its length at least between said control valve end portion and said control valve second bore with a space of small volume extending between the sides of said pin and said walls, quick coupling means mounted on said terminal valve and said control valve detachably connecting said valves, said control valve other end having a stepped recess with the outer portion of said recess being threaded and inner portions of successively smaller diameters, said adjustable means having a stepped periphery with a portion being in threaded engagement with said recess threaded portion and further portions slideably extending in said recess inner portions, an annular elastic sealing element being positioned around an inner portion of said adjustable means periphery between a step thereof and a step of said stepped recess whereby movement of said adjustable means inwardly of said stepped recess causes a squeezing of said sealing element and outward movement of said adjustable means allows said sealing element to provide a radial sealing between said adjustable means and said control valve.

4,005,848

BIDIRECTIONAL PRESSURE-ASSISTED VALVE SEAL

Philip W. Eggleston, Marshalltown, Iowa, assignor to Fisher Controls Company, Inc., Marshalltown, Iowa

Filed Feb. 11, 1975, Ser. No. 548,935

Int. Cl.² F16K *25/00*

U.S. Cl. 251—173 **9 Claims**

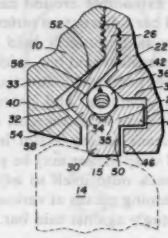
1. A valve structure, comprising

a valve body having a central bore therethrough;

a valve closure member mounted in said bore and movable between an open and closed position about an axis substantially transverse to said bore, and having a peripheral sealing surface;

said valve body including an annular recess circumscribing said bore and disposed in radial alignment with said sealing surface when said closure member is closed and having a first sidewall and a second sidewall, said first sidewall including a converging tapered surface;

a seal member including a peripheral portion in sealing engagement with said valve body, an inner annular sealing portion disposed to engage said sealing surface of said closure member when closed, and an intermediate flexible portion joining said peripheral portion and said inner sealing portion, the junction of said flexible portion and said inner sealing portion defining a channel having first and second side walls; resilient annular means disposed against said walls of said channel and between said annular sealing portion of said seal member and said converging surface of said first body recess sidewall for sliding on said converging surface to provide a moveable fulcrum about which said flexible portion bends for limiting movement of said sealing portion toward said first body recess sidewall and for deflecting and urging said sealing portion radially inward; and



second fulcrum means on said second body recess sidewall;

said annular sealing portion and said intermediate flexible portion of said seal member being substantially completely exposed to fluid pressure acting from either direction in said bore;

whereby by coaction of one of said fulcrum means and said fluid pressure, sealing engagement between said seal member and said peripheral sealing surface of said closure member is improved when said fluid pressure acts on said seal member from either direction and said closure member is in a closed position.

4,005,849

BUTTERFLY VALVE

Thierry Antoine Lorthiois, Nancy, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed Mar. 26, 1975, Ser. No. 562,273

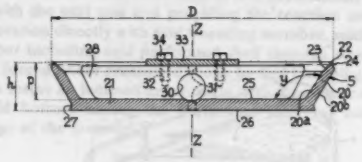
Claims priority, application France, Apr. 30, 1974, 74.15090

Int. Cl.² F16K *1/22*

U.S. Cl. 251—305 **12 Claims**

1. A butterfly valve comprising a body defining a through-way passage having an inlet end for connection to a supply of fluid and an outlet end, a closure member mounted on the body to be rotatable about an axis of rotation transverse to the passage between a passage closing position and a maximum passage opening position which opening position is substantially perpendicular to the closing position, the closure member having the shape of a dish which has an end wall extending transversely of said passage in said closing position and a peripheral annular lateral wall which defines with said end wall a concave side of the dish-shaped closure member which concave side faces said inlet end in said closed position, the

lateral wall having an inner peripherally extending surface which includes two surface portions on opposite sides of said axis, in a major part of the width of the closure member in a direction parallel to said axis, which are divergent in the direction of said inlet end in said closed position and make an angle of between 100° and 130° with the general plane of the end



wall and an outer peripherally extending surface which defines the periphery of the closure member and is substantially wholly divergent in the direction of said inlet in said closed position and said axis of rotation of the closure member being located on the side of said end wall adjacent said inlet end in said closed position.

4,005,850

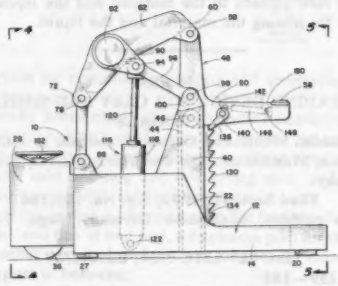
FLOOR JACK

Walter I. Myers, Tulsa; Edgar R. Goodbary, Cardin; Richard L. Thomas, Tulsa; Billy W. Lewis, Cardin, and Francis A. Bartley, Cardin, all of Okla., assignors to Goodbary Engineering Co., Tulsa, Okla.

Continuation-in-part of Ser. No. 458,504, April 8, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,928

Int. Cl.² B60P *1/00*

U.S. Cl. 254—2 R **4 Claims**



1. A floor jack apparatus comprising pneumatic motor means adapted for connection with an outside source of air pressure, hydraulic pump means operably connected with the pneumatic motor means and in communication with a fluid reservoir, hydraulic wheel motor means operably connected with the hydraulic pump means for receiving fluid therefrom to provide forward and reverse directions of movement for the floor jack apparatus, hydraulic lift cylinder means operably connected with the hydraulic pump means for actuation thereby to alternate extended and contracted positions, first shuttle valve means operably connected with the hydraulic pump means for selectively directing the fluid to the wheel motor means and/or the lift cylinder means, second shuttle valve means interposed between the first shuttle valve means and the wheel motor means for selective application of the fluid to the wheel motor means to provide said forward and reverse actuation thereof, third shuttle valve means interposed between the first shuttle valve means and the lift cylinder means for selective actuation thereof, safety valve means operably connected with the lift cylinder means, cross-over relief valve means operably connected with the wheel motor means, and intensifier means operably connected with the lift cylinder means for application of auxiliary fluid under load conditions of the lift cylinder.

4,005,851

HYDRAULICALLY OPERATED DRILLING APPARATUS

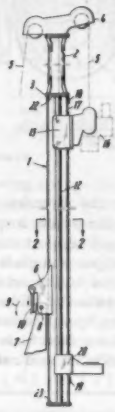
Hans-Otto Plote, Vohrum, Germany, assignor to Werner Nordmeyer Ing. Erben KG, Peine-Handorf, Germany

Filed Nov. 26, 1974, Ser. No. 527,361

Claims priority, application Germany, Dec. 7, 1973, 2361050

Int. Cl.² B66C *23/60*

U.S. Cl. 254—139 **12 Claims**



1. Drilling apparatus comprising an elongated hollow mast formed of a plurality of axially arranged steel pipe sections of circular cross-section secured together in tandem at their abutting ends to form a vertical mast with one section above the other, cover means located at each end of said mast to enclose the same, a drill head moveably mounted on the exterior of said mast, an elongated cable attached to said drill head extending along the length of said mast, and means located within said mast to pull said cable moving said drill head along the length of said mast, said pulling means comprising a pressure operated cylinder/piston motor located within a central one of said steel pipe sections and having a moveable member attached to said cable, first sheave means secured to said moveable member, and second sheave means located respectively within the end sections of said mast, each of said second sheave means being journalled in a bearing secured to the respective cover means, and said cable being entrained over said first and second sheave means and anchored at its ends to the respective bearing means whereby the forces exerted by the movement thereof are absorbed within said mast.

4,005,852

TRACTION SHEAVE WARNING FOR HELICOPTER RESCUE HOIST SYSTEMS

Steven H. Schmitmeyer, Tipp City, and James W. Strayer, New Carlisle, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

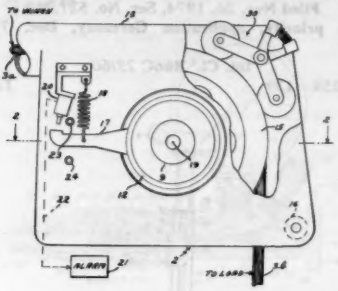
Filed June 27, 1975, Ser. No. 590,881

Int. Cl.² B66D *1/48*

U.S. Cl. 254—173 R **1 Claim**

1. In a hoist employing a winch and cable, a traction sheave mechanism for maintaining tautness in the cable at the winch, particularly in the absence of a cable load, said mechanism

comprising: a traction sheave housing; a traction sheave attached to a shaft rotating in bearings in said housing, said traction sheave frictionally engaging the cable from the winch; a motor support structure mounted on said sheave housing by means of a bearing permitting rotation of the support structure about the axis of said shaft; a motor mounted on said support structure; means including a slipping clutch for coupling the motor to said shaft for continuously applying a



torque to said sheave in the direction to tension the cable between the sheave and the winch; a spring attached to said sheave housing and to said support structure for exerting a rotational force on the support structure that counterbalances the normal traction applied to the cable by the sheave; and means responsive to a rotation of said support structure relative to said sheave housing by a predetermined amount in the direction of said spring force to actuate an alarm signalling a low value of sheave traction on said cable.

4,005,853

MIXING PROCESS AND AN ARRANGEMENT FOR CARRYING OUT THE PROCESS

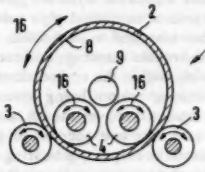
Hans Kimmel, Detmold, Germany, assignor to Gunther Papenmeier KG, Maschinen-und Apparatebau, Detmold, Germany

Filed Dec. 23, 1974, Ser. No. 535,368

Claims priority, application Germany, Dec. 28, 1973, 2364978

Int. Cl.² B01F *9/08*

U.S. Cl. 259—3 **3 Claims**



2. A process for mixing comprising the steps of:

a. rotating a mixing container about its axis at such a speed so that the mix material lies along at least a portion of the container wall;

b. moving the material to be mixed in a back-and-forth movement with the movement in one direction being greater than that in the other direction, said moving being effected by at least two sets of deflection blades, the degree of movement in said directions being determined by the degree of inclination of said blades, said degree of inclination being independently adjustable; whereby the adjustment of the speed of revolution of said rotating container and the degree of inclination of said blades influences the absolute values of the flow rate and the amount of mixing of the material as well as their relationship with respect to each other.

4,005,854

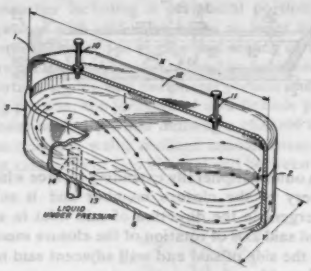
FIGURE EIGHT FLUID FLOW PATTERN MIXING APPARATUS

David L. Patton, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,066

Int. Cl.² B01F *5/02, 5/10, 5/12*

U.S. Cl. 259—4 R **7 Claims**



1. Apparatus for mixing at least one material with a liquid, comprising:

a tank for receiving the material to be mixed with the liquid, said tank including a generally planar bottom section and an adjacent curved section;

a nozzle positioned in said tank for discharging the liquid into said tank;

means for supplying the liquid under pressure to said nozzle; and

said nozzle being oriented to direct the liquid discharged therefrom toward said bottom section of said tank at an angle with respect to said bottom section toward said curved section, the position of said nozzle and the shape of the tank cooperating to impart a generally figure eight fluid flow pattern to the material and the liquid in said tank for mixing the material and the liquid.

4,005,855

KNEADING DEVICE FOR CLAY AND SIMILAR MATERIALS

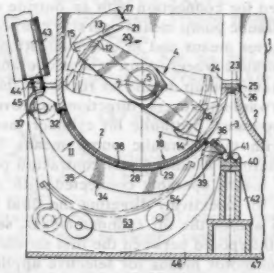
Frank Handle, Muhlacker, Germany, assignor to Karl Handle & Sohne, Maschinenfabrik und Eisengiesserei, Muhlacker, Germany

Filed Sept. 11, 1974, Ser. No. 505,156

Claims priority, application Germany, Sept. 13, 1973, 2346159

Int. Cl.² A21C *1/04*; B29B *1/04*

U.S. Cl. 259—185 **19 Claims**



1. An apparatus for continuous treating of a mass of clay-like material simultaneously discharged uniformly comprising in combination: a frame, rotor means rotatable in said frame on a substantially horizontal axis and comprising at least one

strip-plate formed kneading rasp member located approximately parallel to said axis as offset radially from said axis, a cylinder jacket and a container bottom having a perforated shell with a reaction surface toward said axis located essentially accurately with respect to said rotor means and said frame including therewith said container bottom as a reaction member beneath said rotor means and substantially concentric with the said axis and providing the reaction surface for cooperation directly with said kneading member, said reaction member including said perforated shell through which material is forced under pressure directly by said kneading member which forms an inclined entry angle with the reaction surface of said bottom having the perforated shell for continuous passage of the material.

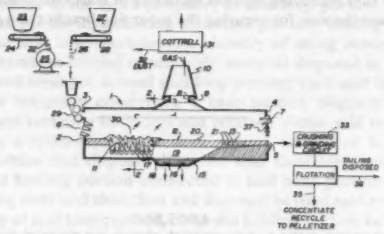
4,005,856
PROCESS FOR CONTINUOUS SMELTING AND CONVERTING OF COPPER CONCENTRATES

Nickolas John Themelis, Beaconsfield, and George Clement McKerrow, Noranda, both of Canada, assignors to Noranda Mines Limited, Pointe Claire, Canada

Continuation of Ser. No. 292,810, Sept. 27, 1972, which is a division of Ser. No. 171,705, Aug. 13, 1971, abandoned. This application June 17, 1975, Ser. No. 588,340

Int. Cl.² C22B *15/06*

U.S. Cl. 266—161 **26 Claims**



1. Apparatus for continuous smelting and converting copper concentrates comprising:

a. a generally horizontally disposed reactor consisting of a single vessel having a single zone where both the smelting and the converting occur together, a settling zone contiguous with said smelting and converting zone and a slag zone contiguous with said settling zone;

b. said reactor having a charging port for feeding the concentrates and flux at one end, a discharge port for the slag at the other end and at least one copper or matte discharge port in between;

c. heating means for inducing and maintaining molten bath conditions in said reactor including at least one fuel-fired burner located at at least one end of said single vessels;

d. mixing means provided in the single smelting and converting zone of said reactor and located between the charging port and the copper or matte discharge port, said mixing means comprising a plurality of jets of an oxidizing gas injected below the surface of the molten bath, said jets being positioned more than 6 feet out from the charging port at said one end in said single smelting and converting zone and having sufficient force to create a turbulent and dynamic state within and above the bath of said single zone during the smelting and converting whereby liquid sulfide is forced through and above the upper slag layer;

e. control means for controlling the introduction of the concentrates and flux through said charging port in balanced relationship to the introduction of oxidizing gas into the reactor; and

f. exhaust means for removing off-gases from the reactor provided in said reactor substantially outside of said single smelting and converting zone.

4,005,857
MEANS FOR WITHDRAWING SPONGE IRON FROM RETORTS

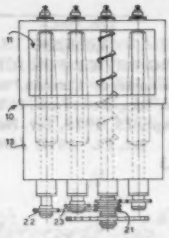
Franco Colautti, Ragosa di Povoletto (UD), Italy, assignor to Kinglor Metor S.p.A., Buttrio (UD), Italy

Filed Apr. 26, 1976, Ser. No. 680,440

Claims priority, application Italy, Apr. 28, 1975, 83366/75

Int. Cl.² F27B *1/20*

U.S. Cl. 266—191 **7 Claims**



1. Means for withdrawing sponge iron from retorts containing ore, which are heated externally, comprising in reciprocal coordination and cooperation a housing having an inlet placed below the outlet of a retort and having an outlet in staggered relation with respect to the position of said inlet and following thereafter, at least three worm screw means within said housing, cooled internally, having a first tapered sector positioned below said inlet; and having a second substantially circular sector extending above said outlet, there being between the length of the inlet and the diameter of each worm screw means a ratio of from about 1 : 4.5 and 1 : 7.

4,005,858
DAMPING MEMBER

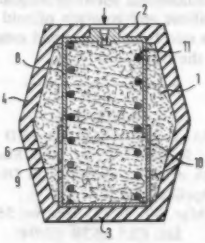
Kaspar Lochner, Karlsburger Str. 7b, 8000 Munich 82, Germany

Continuation of Ser. No. 502,762, Sept. 3, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,812

Claims priority, application Germany, Aug. 31, 1973, 2343926

Int. Cl.² F16F *1/37*

U.S. Cl. 267—136 **11 Claims**



1. Damping member for absorbing mechanical oscillations and impacts applied in a given direction, comprising a chamber having a supporting surface at opposite sides thereof, said chamber being formed with walls extending in the given direction and being at least partly elastic, said partly elastic walls expanding in a direction opposite said given direction upon the application of impacts, damping medium received in said chamber and formed of a tough elastic, lastingly plastic mass, said lastingly plastic mass upon application of said impact moving in the direction toward the expanded area of said partly elastic walls, and a compressible medium received, in addition to said plastic mass, in said chamber, said compress-

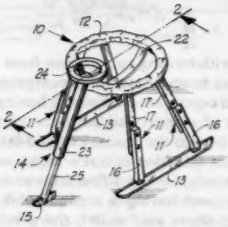
ible medium upon application of said impact being compressed, said plastic mass and said compressible medium being disposed in layers extending transversely to the given direction in said chamber, said partly elastic walls on cessation of said impact rebounding from said expanded position, said compressible medium on cessation of said impact returning to a non-compressed state, and said lastingly plastic mass on said rebounding of said elastic walls and said return to a non-compressed state of said compressible medium moving from the direction of said expanded area into said chamber.

4,005,859

TRAINING DEVICE FOR ICE SKATERS

William Tait, Chelmsford, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 15, 1975, Ser. No. 568,307
Int. Cl.² A61H *3/00*
U.S. Cl. 272—70.3 **5 Claims**



1. A training device for child ice skaters, comprising a plurality of generally vertical support legs, a horizontal body-enclosing rigid member secured to the upper ends of said support legs, a pair of horizontally-extending runners disposed in spaced parallel relation and secured fixedly to the lower ends of selected ones of said support legs, and a steering column secured to said body-enclosing member between said runners extending downwardly and forwardly, said steering column including a hollow longitudinally-extending housing and a rotatable steering element slidably mounted within said housing, a front runner secured to the lower extremity of said steering element which projects outwardly of the lower end of said housing, and spring means positioned within said housing adapted to bias said steering element outwardly from said lower end of said housing, whereby said steering column is longitudinally resilient and rotation of said steering element selectively orients said front runner and establishes the direction of travel for the training device.

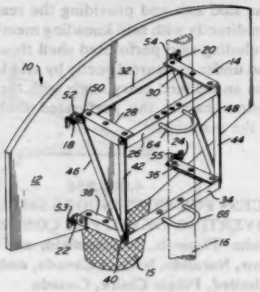
4,005,860

BASKETBALL BACKBOARD AND SUPPORT

John W. Ebstein, Roslyn Heights, and Mario Cambardella, Manhasset, both of N.Y., assignors to Diversified Products Corporation, Opelika, Ala.

Filed Mar. 17, 1975, Ser. No. 559,190
Int. Cl.² A63B *63/04*
U.S. Cl. 273—1.5 R **6 Claims**

1. Apparatus comprising a basketball backboard having a net on one side thereof, a mounting bracket for mounting said backboard on a support at a desired elevation above a playing surface, said backboard having a pair of fastener members generally perpendicular thereto and projecting from an upper portion of said other side of said backboard, said mounting bracket having a pair of saddle brackets, each saddle bracket having a notch on its upper edge, each notch lying in a generally vertical plane which is generally parallel to said backboard, said notches being spaced apart by a distance corresponding to the distance between said pair of bolts so that each notch may receive one of said bolts, said mounting bracket having at least one more saddle bracket below the elevation of said first mentioned saddle brackets, said third mentioned saddle bracket having a notch lying in the same plane as said first and second mentioned saddle bracket notches, said backboard having at least one more bolt projecting from said other surface and generally perpendicular thereto in a location so that it may be received in the notch on



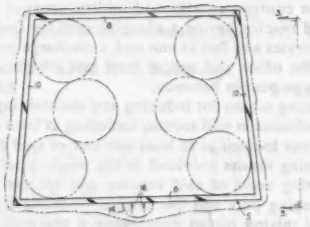
said third saddle bracket, said mounting bracket including a vertically disposed strap having a length corresponding generally to the vertical distance between the location of said third bolt and a line extending between said first and second bolts, and said mounting bracket including at least one brace having means thereon for securing the mounting bracket to a support.

4,005,861

POCKET-BILLIARD TRICK SHOT RACKING DEVICE

Kenneth R. Tomczak, 12053 Brougham, Sterling Heights, Mich. 48077

Filed June 12, 1975, Ser. No. 586,221
Int. Cl.² A63D *15/00*
U.S. Cl. 273—22 **3 Claims**



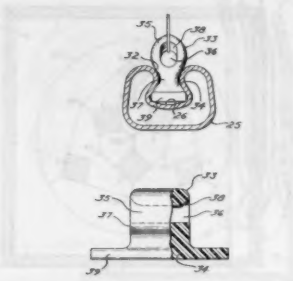
1. Improved pocket-billiard trick shot racking device, whereby to facilitate making pocket-billiard trick shots, said racking device being a four-sided racking device having four walls and a trapezoidal shape in plan view so that it can rack six billiard balls at a time so that four thereof are disposed in the corners of said racking device each touching two walls of said device and the other two thereof are inside of said corner balls, said two innermost balls touching two of said corner balls and being spaced apart from each other so that the space between them is less than the diameter of the cue ball said walls having inside dimensions of length for any given diameter of billiard balls as follows: the front; rear; and side walls, respectively, being 3.717 diameters; 3.171 diameters; and 2.846 diameters.

4,005,862

GAME RACKET STRING SUSPENSION

William E. Portz, and Eugene W. Fileger, both of Geneva, Ohio, assignors to True Temper Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 86,042, Nov. 2, 1970, Pat. No. 3,751,034. This application Jan. 22, 1973, Ser. No. 325,253
Int. Cl.² A63B 51/00
U.S. Cl. 273—73 D 2 Claims



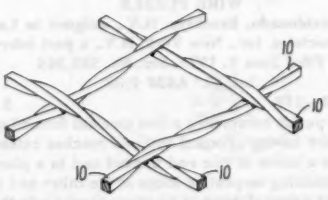
1. A game racket comprising a loop portion defined by elongated frame means; said loop portion having a handle; said frame means having a recess formed longitudinally of said frame means at the inner periphery of said loop portion; said frame means having retaining shoulders partially closing said recess at said inner periphery; a plurality of string mounting insert members formed of semirigid material disposed in said recess and arranged around said loop portion; each said insert member integrally comprising a base portion disposed beneath said retaining shoulders and retained within said recess thereby, a relatively narrow neck portion connected to the base portion and disposed between said shoulders, and an enlarged holding portion connected to said neck portion and extending over said shoulders and disposed beyond said recess inwardly of said loop portion; each said holding portion having a string receiving through opening therein disposed entirely inwardly of said frame means; at least certain of said insert members having integral base extensions projecting from said base portions and disposed on either side of said base portions in the recess in the longitudinal direction thereof and abutting adjacent insert members around said loop portion, said base extensions being adapted to be cut to desired lengths for adjusting the spacing of said insert members around said loop portion, and said base extensions having longitudinal reinforcing ribs projecting therefrom.

4,005,863

TENNIS RACKETS

Dana R. Henry, 200 W. Mason St., Apt. 14, Santa Barbara, Calif. 93101

Filed Oct. 4, 1974, Ser. No. 512,095
Int. Cl.² A63B 51/02
U.S. Cl. 273—73 D 3 Claims



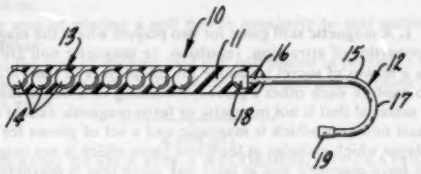
1. A tennis racket comprising a frame and a racket string grid face attached to the frame, said grid face consisting of two mutually perpendicular sets of equally spaced, interlaced, alike, extruded strings, said strings having angular cross-sections and peripheral surfaces formed by alike, intersecting surface portions defining at least two edges, said surface portions and edges being helically shaped by extrusion to thereby be free of internal strain tending to return them to a non-helical condition.

4,005,864

RACKET WEIGHTING MEANS

Samuel F. Stewart, 616 Sherwood Drive, Carlisle, Pa. 17013

Continuation-in-part of Ser. No. 521,177, Nov. 6, 1974, abandoned. This application July 11, 1975, Ser. No. 596,038
Int. Cl.² A63B 49/04
U.S. Cl. 273—73 k 8 Claims



1. An improved racket weighting means for use with a racket having a shaft with a throat connected to a frame comprising:

a. a non-continuous flexible elongated member adapted to be wrapped at least one time around the throat of said racket, said member being molded,

b. a supplemental weight integrally associated with said member, said supplemental weight being internally disposed in said member and including a plurality of longitudinally spaced weight members which are integrally molded within said elongated member, and

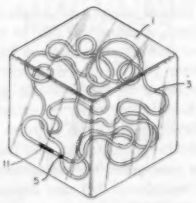
c. means for attaching said member to said racket.

4,005,865

THREE-DIMENSIONAL AMUSEMENT DEVICE

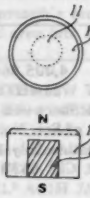
David Conrad Kidder, Box 902, Pointe Aux Pins, Mich. 49775

Filed Sept. 29, 1975, Ser. No. 617,900
Int. Cl.² A63F 9/06
U.S. Cl. 273—109 5 Claims



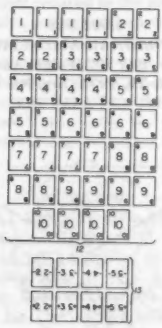
1. A device comprising a container having therein a hollow and transparent tube, said tube being joined at its ends and provided with a plurality of bends in different planar directions to form a three-dimensional passageway network, an indicator means within said passageway capable of moving freely through said passageway by force of gravity, and a barrier means located within said passageway past which said indicator means cannot move and being indicatively marked to signify start and finish, said container being sufficiently transparent to allow viewing of said indicator means in any location within said passageway.

4,005,866
MAGNETIC GAME
Jean Pierre Marcil, 22 Mac Donald St., Maple Grove, Beauharnois, Quebec, Canada (J6N 1N9)
Filed Sept. 15, 1975, Ser. No. 613,403
Int. Cl.² A63F *3/00*
U.S. Cl. 273—131 A 1 Claim



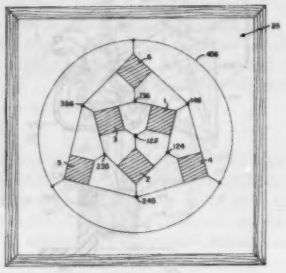
1. A magnetic skill game for two players where the magnetic properties of attraction, repulsion, or magnetic null are used as a means of secret guidance for the players in their attempt to capture each other's pieces; consisting of a board made of a material that is not magnetic or ferro-magnetic except for at least one case which is magnetic and a set of pieces for each player which includes at least one piece which is not magnetic or ferro-magnetic and at least one piece that is magnetic; the latter being visually distinguishable from all other pieces, and at least one piece that is magnetic, the polarity of the latter being opposite for opposite players; the pieces of a player appearing identical except for the magnetic piece.

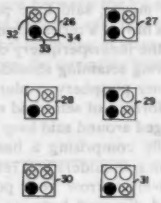
4,005,867
CARD GAME
Michael Joseph Yaeger, Apartado 97, Altea, Alicante, Spain
Filed June 12, 1975, Ser. No. 586,187
Int. Cl.² A63F *3/00*, *1/00*
U.S. Cl. 273—135 R 3 Claims



1. In combination, a playing board and a pack of cards, the pack of cards including a set of frist cards, each carrying a different numeral thereon, a set of second cards having a "minus" point scoring value indicated thereon, a set of third cards having a "plus" point scoring value indicated thereon, the board being divided into differently numbered spaces into which the cards may be played, there being one space for each different numeral on the cards of the pack, said first set of cards carrying no point scoring value thereon, and a fourth set of cards in said pack of cards, each having at least two numerals thereon, one of said numerals on the cards of said fourth set indicating a point scoring value.

4,005,868
PUZZLE
Piet Hein, Stoke Poges, England, assignor to Stiftung Fuer Humaniora und Wissenschaft
Filed June 23, 1975, Ser. No. 589,635
Claims priority, application Denmark, June 24, 1974, 3391/74
Int. Cl.² A63F *9/06*
U.S. Cl. 273—156 10 Claims



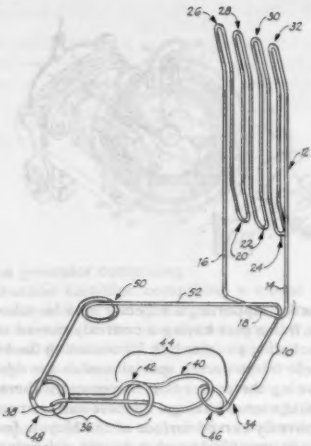


1. A puzzle comprising:
a. a game board having geometrical areas thereon which are representations of the surfaces of a three-dimensional polyhedron, said areas being mutually spaced from each other, said board having a plurality of common points depicted thereon corresponding in number to the number of corners which the polyhedron has that are defined by the vertexes of adjoining surfaces, a set of lines on said board for each of said common points, each set connecting one said common point to the vertexes of those geometrical areas which represent a particular group of corner-defining adjoining surfaces of the polyhedron; and
b. a set of playing pieces, corresponding in number and in shape to said areas, each said playing piece having on one said an indicium at each vertex, each indicium being one of a number of different indicia which number corresponds to the number of surfaces meeting at one of the corners of the polyhedron, the indicia on each said piece being so combined that none of the pieces are identical.

4,005,869
WIRE PUZZLE
Francisco Maldonado, Brooklyn, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest
Filed June 9, 1975, Ser. No. 585,364
Int. Cl.² A63F *9/08*
U.S. Cl. 273—158 5 Claims

1. A wire puzzle comprising a first element formed of a first length of wire having opposed external reaches extending to terminate in a union at one end thereof and in a plurality of inwardly extending serpentine loops at the other end thereof, said opposed external reaches forming respectively the outer side of each of the outermost of said serpentine loops, the inner closed ends of said serpentine loops terminating in

spaced relation to said union, and a second element formed of a second length of wire which includes a first segment extending from a free end of said wire a predetermined distance to a location at which the wire is bent about itself to form a first loop, the wire being configured in spaced relation to said first segment to form a second loop thereabout adjacent the end of said first loop closest to said free end, a second segment of said



wire extending from said second loop in spaced generally parallel relation to said first segment beyond said free end and peripherally in a closed circuit to terminate in a third loop configured about the wire which forms said first loop and spaced therefrom, the width of said serpentine loops being smaller in dimension than the inner diameter of said first, second and third loops.

4,005,870

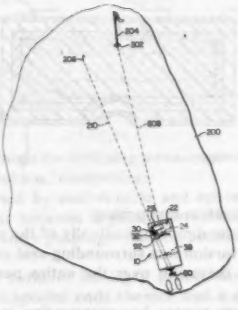
GOLF PUTTING TRAINING METHOD

Henry A. Grace, 3412 Pennsylvania St., Hyattsville, Md. 20783, and Robert G. Conrad, 1600 Dillon Road, Maple Glen, Pa. 19002

Division of Ser. No. 411,028, Oct. 30, 1973, Pat. No. 3,917,280, which is a continuation-in-part of Ser. No. 313,352, Dec. 8, 1972, abandoned. This application Oct. 7, 1975, Ser. No. 620,373

Int. Cl.² A63B *69/36*

U.S. Cl. 273—183 R **4 Claims**



1. A method for learning to accurately putt a golf ball comprising:

the step of providing a machine which is capable of repeatedly projecting a golf ball from a first area on a putting green to a second area on said putting green for a given disposition of said machine;

the step of estimating the distance between said first and said second areas;

the step of estimating the direction a golf ball should follow to roll on said putting green from said first and to said second area;

the step of setting said machine at said first area in accordance with said estimates of distance and direction;

the step of positioning a golf ball to be projected by said machine from said first area to said second area;

the step of projecting said positioned golf ball by said machine to said second area;

repeating, if necessary, the two steps of estimating, the step of setting said machine and the steps of positioning and projecting said golf ball until said golf ball is projected by said machine into said second area;

the step of marking the putting plane through which said golf ball was projected by said machine into said second area;

the step of placing a golf ball in proximity to said putting plane;

and the step of stroking said golf ball placed in proximity to said putting plane with a putter using said putting plane as a guide.

4,005,871

MARKING DEVICE FOR A RECORDING APPARATUS

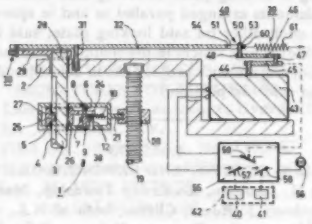
Gerhard Habelt, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 17, 1975, Ser. No. 596,952

Claims priority, application Austria, July 26, 1974, 6166/74

Int. Cl.² G11B *27/00*

U.S. Cl. 274—1 R **3 Claims**



1. A marking device for making marks at a selected one of two marking zones extending adjacent each other in the longitudinal direction of an index strip, comprising a frame, a spindle mounted in the frame, an actuating lever mounted for pivotal movement about the spindle, means for making a mark in a respective one of said two zones in response to pivoting of said lever in one of two opposite directions from a rest position, said means comprising a marking element and a linkage means for moving the element in a respective one of two directions in response to pivoting of said lever in opposite directions, and a control device for pivoting said lever in a selected one of said two opposite directions,

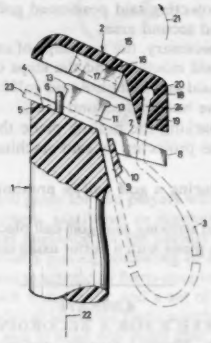
wherein said control device comprises a crank, means for rotating the crank one full revolution about an axis in a selected one of two opposite directions of rotation from a rest position, said means comprising a motor and a motor control, and a connecting link connected to said crank at a first pivotal connection and connected to said actuating lever at a second pivotal connection, one of said pivotal connections being a pin-slot connection; in said rest position said pivoting spindle, said axis and said first pivotal connection being disposed substantially in a straight line, a longitudinal direction of said slot being aligned with said straight line and the pin being at an end of said slot such that upon initial rotation of said crank from said rest position said pin and slot undergo relative movement until the pin engages an opposite end of the slot.

4,005,872

SKI-POLE GRIP HAVING RELEASABLE STRAP ATTACHMENT

Karl Rischert, Alpsteinweg 12, D-7750 Konstanz, and Peter Drossler, Uhlandstr. 1, D 7972 Isny, both of Germany

Filed Nov. 11, 1975, Ser. No. 630,855
Claims priority, application Germany, Feb. 14, 1975, 2506221
Int. Cl.² A63C 11/22
U.S. Cl. 280—11.37 H 15 Claims



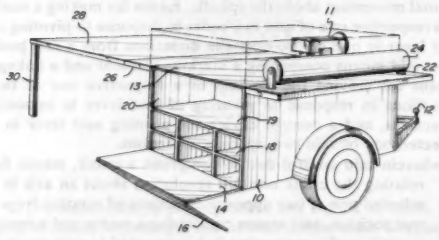
1. A ski-pole grip comprising a grip portion having an end-face, a cap portion adapted to cover said end-face, a strap connected at one end to said grip portion and at the other end to said cap portion, and means on said end-face and on said cap portion to effect a releasable snap-on connection of said cap portion to said end face, said releasable connection means comprising a locking plate covering said end-face and two locking elements arranged parallel to and in spaced relationship with each other on said locking plate, said locking elements including lugs which, in the snapped-on condition of the connection, engage with projections in corresponding locking recesses in said cap portion.

4,005,873

PORTABLE CUTTING AND SEWING WORK STATION

Theodore H. Jacobsen, Rockaway Township, Morris County, and Anthony J. Russo, Clifton, both of N.J., assignors to F.P.M. Corporation, Paterson, N.J.

Filed Nov. 14, 1975, Ser. No. 631,897
Int. Cl.² B60P 3/10
U.S. Cl. 280—63 3 Claims



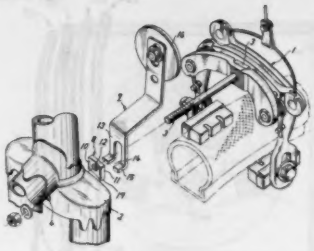
1. A portable cutting and sewing work station comprising a trailer comprising a base and a plurality of vertical walls, said trailer adapted to be towed by a motor vehicle, a sewing machine supported on said trailer, a recessed work seat proximately disposed adjacent to said sewing machine, said work seat supported by said trailer whereby a portion thereof is integral with one of said vertical walls, and a collapsibly foldable rolled fabric storage and dispensing area located behind said work seat.

4,005,874

MEANS FOR SUPPORTING A REFLECTOR ATTACHING BRACKET FOR A BICYCLE

Tadakatsu Ohtani, Sagamihara, Japan, assignor to Nichibei Fuji Cycle Co., Ltd., Tokyo, Japan

Filed Feb. 13, 1975, Ser. No. 549,744
Int. Cl.² B62J 5/20
U.S. Cl. 280—289 H 3 Claims



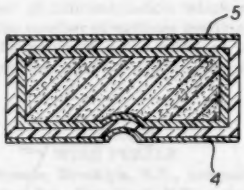
1. A means for supporting a reflector on a bicycle comprising a bicycle frame part having a convexly curved surface, a brake unit including a center bolt for mounting the brake unit on said bicycle frame part, a special washer provided with a hole for allowing the center bolt to penetrate therethrough, one face of said washer having a concave surface corresponding to the convexly curved surface of the bicycle frame part; and a reflector attaching bracket having a lapping portion which is brought into contact with said special washer and provided with a cut-out space for allowing the center bolt to penetrate therethrough, said reflector attaching bracket including a folded fork at its lower end adapted to engage with the lower edge of the special washer, wherein said reflector attaching bracket and said special washer are held between the brake unit and the bicycle frame part.

4,005,875

SKI CONSTRUCTION OF THE TORSION BOX TYPE

Gunnar Bjertnaes, 2820 Biri, Norway

Filed Dec. 5, 1975, Ser. No. 638,280
Claims priority, application Norway, Dec. 13, 1974, 744504
Int. Cl.² A63C 5/00
U.S. Cl. 280—610 4 Claims

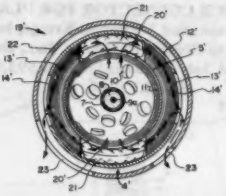


1. A ski construction comprising:
a foam core extending longitudinally of the ski;
a first unitary torsion box surrounding said core in secured relationship therewith over the entire periphery of the core;
a second unitary torsion box surrounding said first box in secured relationship therewith over the entire periphery of the first box, said second box having higher tensile strength properties than said first box.

4,005,876
GAS GENERATOR FOR AUTOMOBILE SAFETY CUSHIONS

Howard E. Jorgensen, Hyrum; George F. Kirchoff, Brigham City, and Fred E. Schneiter, North Ogden, all of Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed Apr. 10, 1975, Ser. No. 566,871
Int. Cl.² B60R 21/10
U.S. Cl. 280—741 2 Claims



1. A gas generator comprising:

a combustion cartridge comprising a closed tube, a gas generant material and igniter therefore in the tube, filtering screens inside the tube surrounding the gas generant, and two diametrically opposite openings in the tube through which combustion gases may flow;

an outer case surrounding the combustion cartridge and having two diametrically opposite openings that are angularly spaced 90° from those in the combustion cartridge;

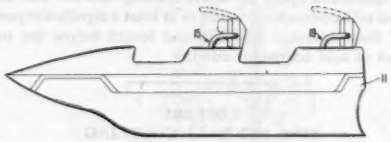
two long, plastic-film packages of pH neutralizing material, one located at each opening of the combustion cartridge and confined between the combustion cartridge and the outer case; and

layers of wire screen oriented circumferentially about the combustion cartridge and confined between the combustion cartridge and the outer case, and between the two packages of pH neutralizing material, whereby combustion gases from the combustion cartridge must flow through the screens, substantially parallel to the layers thereof, before being discharged through the openings in the outer case, thereby providing a long path for the gases through a minimal volume of screen.

4,005,877
VEHICLE PASSENGER RESTRAINT MECHANISM

Thomas Milton Humphries, Cupertino, Calif., assignor to Arrow Development Co., Inc., Mountain View, Calif.

Filed Feb. 24, 1975, Ser. No. 552,769
Int. Cl.² B60R 21/08
U.S. Cl. 280—748 15 Claims



1. A mechanism for retaining a passenger in a seat attached to a moving vehicle, comprising:

means carried by said vehicle and operable by hand for movement between a passenger restraint position near said seat and a passenger loading position away from said seat,

a hydraulic cylinder having a piston movable therealong between opposite ends thereof and a shaft attached to said piston and extending completely through said cylinder and through said opposite ends in a liquid tight manner for all positions of said piston therebetween, one of said cylinder and one end of said shaft being fixed with respect to said vehicle and the other of said cylinder and said one end of said shaft being attached to said movable restraint mechanism, whereby movement of the restraint mechanism between its extreme passenger restraint and loading positions causes said piston to move between its said opposite ends of the cylinder,

a fluid path external of said cylinder and connected to carry fluid between said opposite ends of said cylinder,

fluid control means operably connected as part of said fluid path for permitting fluid to flow in only one direction when actuated into a first mode, that direction being such as to permit said passenger restraint means to move toward said seat but not away from the seat, said fluid control means allowing fluid to flow in an opposite direction when actuated into a second mode,

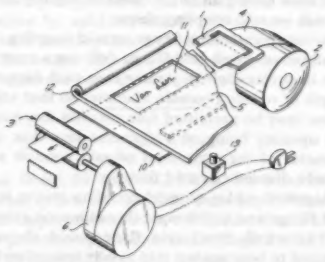
a mechanical control operable between two positions relative to said vehicle and connected to actuate said fluid control means into its first and second modes when the mechanical control is, respectively in its first and second position, and

means cooperatively connectable with another end of said shaft for mechanically preventing relative movement between said cylinder and said shaft in a direction permitting the restraint mechanism to move beyond a fixed position in the direction toward its said loading position when said mechanical control is in its first position, thereby providing a mechanical backup to the hydraulic restraint of the passenger.

4,005,878
METHOD AND DEVICE FOR THE ASSESSMENT OF SIGNATURES FOR FORGERIES

Willem van Leer, Haifa, Israel, assignor to Hydrophilics International, Inc., New York, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,286
Claims priority, application United Kingdom, July 28, 1975, 31556/75; Sept. 26, 1975, 39578/75
Int. Cl.² B42D 15/00, 19/00
U.S. Cl. 283—8 R 10 Claims



1. An apparatus for use in forming a distorted signature so as to prevent forgery comprising:

a. a moving surface on which a visible image can be formed;

b. means to provide a visible image on said moving surface in response to application of pressure;

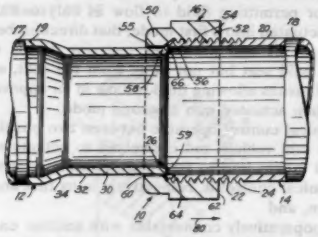
c. means to move said moving surface relative to a document being signed during the process of signing; and

d. means for positioning a document to be signed over said moving surface and said visible image forming means.

4,005,879
CONDUIT JOINT

Sidney Berger, Great Neck; Salvatore Buda, East Hills, and Burton Weintraub, Old Bethpage, all of N.Y., assignors to Berger Industries, Inc., Maspeth, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,105
Int. Cl.² F16L 19/00
U.S. Cl. 285—31 7 Claims



1. In combination:

a. a first two-ended conduit section having a circular outer wall surface and an axial passageway therethrough, one end of said first conduit section being non-threaded and having a flat end face substantially perpendicular to the longitudinal axis of said first section, said first section including a length of reduced outside diameter extending axially inwardly from said flat substantially perpendicular end face and terminating at a sloped annulus in said outer wall surface where it joins the remainder of said first conduit section, said length of reduced outside diameter having an outward flare with an axially inward surface, said flare being immedately adjacent said flat substantially perpendicular end face, said axial passageway being of a reduced diameter through said length, said other end of said first conduit section having external thread means thereon and a flat substantially perpendicular end face;

b. a second conduit section identical to the first conduit section;

c. a coupling sleeve having an axially inward and axially outward end, said axially outward end having an end face, said coupling sleeve having a portion including female thread means extending from said end face and constructed and dimensioned to engage said external thread means on said other end of said second conduit section;

d. said flare having an outer diameter slightly less than said portion on said coupling sleeve;

e. an inwardly extending flange on said coupling sleeve at its axially inward end, said flange defining a central opening of a diameter slightly greater than said diameter of said length of reduced outside diameter so that said coupling sleeve may be permitted free rotation thereon, said central opening being of a diameter less than the outside diameter of the remainder of said conduit section and outside diameter of said flare;

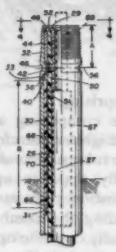
f. a sloped shoulder on said coupling sleeve intermediate said flange and said female thread means extending radially outwardly from said flange, said sloped shoulder adapted to bear against said axially inward surface of said flare, said shoulder preventing said coupling sleeve from being pulled axially outwardly from said first conduit section as said coupling sleeve is threaded onto said externally threaded other end of said second conduit section so as to force said flat substantially perpendicular end faces of said first and second conduit sections together;

g. said length of reduced outside diameter extending axially inwardly at least the length of said coupling sleeve, said sloped annulus cooperating with said flange to restrict the axially inward distance said coupling sleeve may move on said first conduit section so that said coupling sleeve may be backed off said externally threaded other end of said second conduit section after said first and second conduit sections are assembled whereby said end face of said coupling sleeve is at least flush with said flat substantially perpendicular end face of said first conduit section to permit said first conduit section to be laterally displaced from said second conduit section without longitudinal movement of either conduit section.

4,005,880
GAS SERVICE CONNECTOR FOR PLASTIC PIPE

Gerald L. Anderson, and Wilbur R. Kresge, both of Bradford, Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed July 3, 1975, Ser. No. 592,974
Int. Cl.² F16L 11/12
U.S. Cl. 285—47 10 Claims



1. A gas service connector for connecting a plastic underground gas supply conduit to an aboveground installation comprising in combination:

a. a plastic gas carryable connector conduit of continuous length extending from an inlet end adapted for connection to a plastic underground gas supply conduit to an outlet end adapted to terminate aboveground;

b. a tubular metallic sleeve continuously jacketing said connector conduit in generally spaced relation thereabout from on an underground section of the connector conduit to a termination end at least encircling the outlet end of the connector conduit, said sleeve including coupling means at said termination end for connection to the installation with which the service connector is to be employed;

c. seal means for effecting a gas-tight relation between said sleeve and said connector conduit;

d. interlock means effectively interlocking said connector conduit and sleeve to resist axial displacement therebetween with a force at least equal to the tensile strength of said connector conduit at 150° F.; and

e. a reinforced epoxy fill in the spacing between said sleeve and said connector conduit in at least a significant portion of their common aboveground length below the outlet end of said connector conduit.

4,005,881
RING SET BALL COUPLING

James A. Burton, and Gerald A. Marsh, both of Houston, Tex., assignors to HydroTech International, Inc., Houston, Tex.

Filed Aug. 6, 1975, Ser. No. 602,439
Int. Cl.² F16L 27/06
U.S. Cl. 285—111 16 Claims

1. Apparatus for connecting the ends of two pipes comprising;

a pair of coupling members, each of which is connectible at one end thereof to the end of one of said pipes;

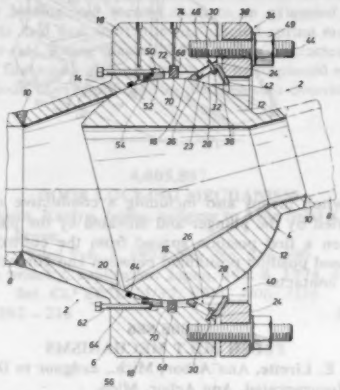
one of said coupling members having attached to the other end thereof an annular spherically-shaped enlarged portion having axially forward and rearward sides;

the other coupling member having attached to the other end

thereof a housing having an internal surface for receiving the spherically-shaped forward side of said enlarged portion in mating engagement therewith, thereby enabling the central axes of the coupling members to be inclined at an angle relative to each other for connecting similarly inclined pipe ends;

seal means disposable between said enlarged portion and said housing for providing a fluid seal therebetween;

a plurality of cam members supported in circumferentially disposed relation about said housing and movable axially



and radially inward towards said internal surface between a retracted position in which said housing freely receives the spherically-shaped forward side of said enlarged portion in mating engagement therewith, and an extended and locked position in which said cam members engage said spherically-shaped rearward side at a plurality of points circumferentially thereabout to urge said enlarged portion into positive contact with said housing to restrain said coupling members against relative axial separation;

and means for moving said cam members towards said extended and locked position.

4,005,882

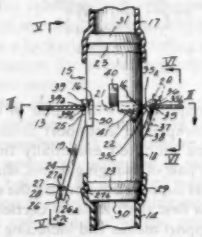
HOSE CONNECTOR FOR AUTOMATIC WASHER

William R. Rickel, St. Joseph, and Dale Edward Mueller, Benton Harbor, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed July 21, 1975, Ser. No. 597,661

Int. Cl.² F16L *5/00*

U.S. Cl. 285—194 **19 Claims**



1. A panel mounted hose connector selectively movable between a first retracted position and a second extended position, comprising:

a generally hollow, elongate cylindrical body forming a passage for conducting fluid and adapted to be positioned in an aperture defined by a panel wall;

first and second locking means connected to said body and each comprising,

an elongated resilient shaft angled outwardly from said connector body and yieldable radially inwardly toward said body along the length of said shaft from an unstressed position to a position contacting said connector body,

each said shaft being notched adjacent the free end thereof to form a latch for engaging said panel wall adjacent the perimeter of said aperture and locking the connector in one of said first and second positions; and

the free ends of the shafts being spaced longitudinally of said body.

4,005,883

TUBE COUPLINGS

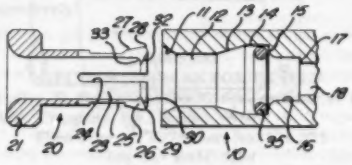
John Derek Guest, "Iona" Cannon Hill Way, Bray, Maidenhead, Berkshire, England

Filed Aug. 1, 1975, Ser. No. 600,941

Claims priority, application United Kingdom, May 8, 1974, 34327/74

Int. Cl.² F16L *21/06*

U.S. Cl. 285—322 **18 Claims**



1. In a tube coupling of the kind having a collet comprising a cylindrical portion with a cylindrical base and with resilient arms arranged to cooperate with a cam surface which cam surface is extending axially from one end of said cylindrical portion constituted by a member surrounding the collet and having an internal surface tapering to a smaller diameter in one axial direction engaging the arms so that the arms are forced inwardly by axial movement of the collet in said one direction, the improvement wherein the arms have, near their outer ends, radially inwardly extending projections which, when the aforesaid cam surface and tapered surfaces are engaged to force the arms inwardly, extend radially inwardly to positions nearer the axis of the collet than the surface defined by said cylindrical bore, and when the arms of the collet are spaced apart in the circumferential direction such that, in the absence of any tube within the collet, the arms can move inwardly to permit of the collet being withdrawn from said member by axial movement in said one direction and wherein said member has a shoulder facing the ends of the arms of the collet, the shoulder defining a bore of smaller diameter than the bore through the collet.

4,005,884

PIPE COUPLING

Mordechai Drori, 89 Zahal St., Kiron, Tel-Aviv, Israel

Continuation of Ser. No. 370,742, June 18, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,092

Claims priority, application Israel, June 21, 1972, 39734; Sept. 27, 1972, 40452

Int. Cl.² F16L *21/06*

U.S. Cl. 285—323 **7 Claims**

1. A pipe coupling producing a tight seal and a firm clamping action when applied to a pipe, comprising:

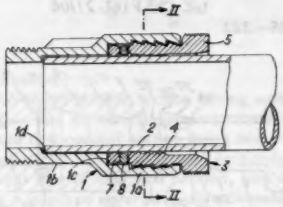
A. a collar formed with an internal screw-threaded portion adjacent to an open end thereof, and with an internal annular shoulder between said screw-threaded portion and the opposite end of the collar;

B. a sleeve having a leading portion receivable within the collar and formed with external screw-threads cooperable with the internal screw-threads of the collar, said sleeve

also having a manipulatable trailing portion to be disposed external to the collar to enable screwing the leading portion of the sleeve into the collar, at least the leading portion of the sleeve being axially split to permit the radial contraction thereof and being formed on its inner surface with inwardly directed protrusions;

C. and a resilient sealing ring of a diameter to be loosely received around the pipe and to be disposed between said internal shoulder of the collar and the end face of the leading portion of the sleeve when the latter is threaded into the collar;

the screw-threads of the collar and sleeve being formed in cylindrical surfaces of substantially uniform diameter throughout the length of their respective screw-threaded portions and having a sloping back face facing the trailing portion of the sleeve and said open end of the collar, respectively, such that when the pipe is disposed within the collar and the sleeve, with the screw-threads of the leading portion of the sleeve inter-



engaging those of the collar and the manipulatable trailing portion of the sleeve projecting from the collar, and with the sealing ring interposed between the internal shoulder of the collar and said end face of the sleeve; rotating the sleeve by means of its manipulatable trailing portion to displace the sleeve axially of the collar;

i. first effects the seal by causing the said end face of the sleeve to apply an axial force to the sealing ring to axially compress it and thereby to radially expand it into sealing engagement with the pipe and collar;

ii. and then, by virtue of the sealing ring and shoulder thereafter serving as an abutment limiting the further axial displacement of the sleeve within the collar, causes the sloping faces of their interengaging screw-threads to effect the radial contraction of the threaded portion of the sleeve for the complete length of the interengaging threads to force the sleeve protrusions into the pipe throughout the length of the said interengaging threads.

4,005,885

REMOTE CONTROLLED DOOR AND WINDOW

George K. Austin, Jr., P.O. Box 209, Rte. 2, Box 254, Newberg, Oreg. 97132

Filed Feb. 11, 1976, Ser. No. 657,145
Int. Cl.[2] E05B 51/02
U.S. Cl. 292—144 6 Claims

1. In a remote controllable lock,

bracket means mountable on a casement frame,

a plunger having a dead bolt portion, and mounted movably on the bracket means,

motive means carried by the bracket means for moving the plunger between a locking position and an unlocking position,

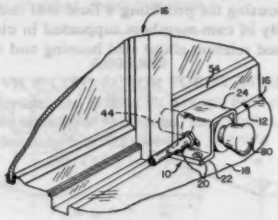
the plunger having a handle portion adapted to be manually grasped for manually moving the plunger between its locked and unlocked positions,

the motive means comprising a piston on the plunger and a cylinder adapted to receive air under pressure,

indicator means,

and switch means fixed relative to the bracket means and operable by the plunger to indicate the position of the plunger,

the switch means including a pair of contacts mounted on the cylinder in spaced apart positions and electrically insulated from each other,



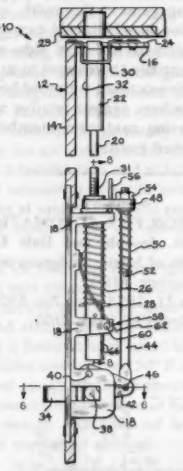
the switch means also including a conductive contactor carried by the plunger and movable by the plunger between a first position spaced from the contacts and a second position positioned between and contacting both the contacts.

4,005,886

FLUSH BOLT MECHANISMS

Douglas E. Lirette, Ann Arbor, Mich., assignor to Door Controls Incorporated, Ann Arbor, Mich.

Filed Dec. 18, 1975, Ser. No. 642,183
Int. Cl.[2] E05C 7/06
U.S. Cl. 292—177 9 Claims



1. For use in conjunction with a pair of swinging doors, a bolt mechanism comprising a support member having a surface adapted to be mounted essentially flush with the free edge of one of the pair of swinging doors, shaft support means extending from said support member on the side thereof opposite said surface, a first shaft slidably carried adjacent to said surface by said support means and including a latch bolt at one end thereof adapted to be extended beyond a horizontal edge of the door, spring means normally biasing said first shaft to a retracted position, a cam pivotally carried by said support member on an axis parallel to said first shaft and extending beyond the surface thereof and adapted to be engaged by the other of the swinging doors, a cam follower engaged by said cam, said cam follower being pivotally carried by said support member on an axis parallel to said surface and in a plane perpendicular to said first shaft and having a lever arm extend-

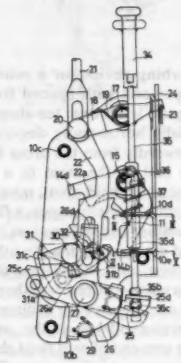
ing inward beyond said first shaft for movement about the cam follower axis, a second shaft parallel to said first shaft and pivotally carried at one end by the inward distal end of said lever arm and carried at the other end by a said first shaft so that linear movement can be imparted to said first shaft against the bias of said spring means upon generally axial movement of said second shaft in response to pivoting of said cam when engaged by the other of the swinging doors, said second shaft being carried in parallel relationship by said first shaft by a slide connection, and an override spring means normally biasing said second shaft to an extended position relative to said first shaft, the first-named spring means and said over-ride spring means having spring characteristics so that said first-named spring means can be displaced axially by a lesser load than is required to displace said override spring means.

4,005,887

DOOR LOCKING MECHANISM

Shoji Itakura, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Feb. 3, 1975, Ser. No. 546,690
Claims priority, application Japan, Feb. 8, 1974, 49-16539
Int. Cl.² E05B *65/32*; E05C *3/06*, *3/36*
U.S. Cl. 292—216 **5 Claims**



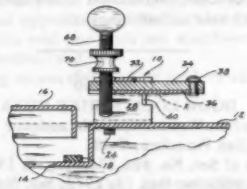
1. A door locking mechanism for a vehicle comprising:
a latch member;
a detent operatively engageable with said latch member for maintaining said latch in a latched position;
a release member operatively engaged with said detent at an unlocked position during an unlocked operation of said mechanism for releasing said engagement of said detent with said latch member, and operatively disengaged from said detent at a locked position during a locked operation of said mechanism for preventing release of said detent from said latch member;
inside and outside opening means respectively connected to said release member for controlling the engagement of said release member with said detent;
a locking lever operably connected to said release member and shiftable between an unlocked position thereof and a locked position thereof for shifting said release member between said unlocked and locked pos .ions thereof;
a cancelling lever pivotably mounted on said locking lever and shiftable between an unlocked position thereof wherein said locking lever is in said unlocked position thereof, and a keyless locked position thereof wherein said locking lever is in said locked position thereof, and through a locked position thereof wherein said locking lever is in said locked position thereof, said cancelling lever being engageable with said detent only during said locked position thereof so as to thereby return said locking lever to said unlocked position thereof;
first means for shifting said cancelling lever between said unlocked and locked positions thereof together with said locking lever, and for permitting said cancelling lever to be shifted between said locked and keyless locked positions thereof independently of said locking lever;
a keyless locking lever shiftable between an unlocked position thereof, wherein said locking lever is in said unlocked position thereof, and a keyless locked position thereof, wherein said locking lever is in said locked position thereof, and through a locked position thereof, wherein said locking lever is in said locked position thereof;
second means for shifting said locking lever between said unlocked and locked positions thereof together with said keyless locking lever and for maintaining said locking lever at said locked position thereof when said keyless locking lever is shifted to said keyless locked position thereof for shifting said cancelling lever to said keyless locked position thereof; and
rod means connected to said keyless locking lever and movable between first, second and third positions thereof for shifting said keyless locking lever between said unlocked, locked and keyless locked positions thereof, respectively.

4,005,888

SECURING MEANS FOR PANELS

Axel Moeller, St. Petersburg Beach, Fla., assignor to The Ludwig Mfg. Company, Inc., Racine, Wis.

Filed May 12, 1975, Ser. No. 576,375
Int. Cl.² E05C *5/04*
U.S. Cl. 292—256.71 **3 Claims**



1. A means of securing a panel in an opening in a wall, said means comprising a body portion, a sliding member embraced by said body, said sliding member having upper and lower plane surfaces and laterally-opposed edges, and being slidably confined within said body; said sliding member having a forward end and a rear end, said body having upright, laterally-spaced walls embracing said laterally-opposed edges of said sliding member, a planar friction-inducing member initially formed non-planar and in contact with said lower surface of said sliding member and mutually slidable with said sliding member, a plurality of support lugs in said body and integral with said upright walls and directed mutually inwardly and substantially normal to said walls, and engaging the lower surface of said friction-inducing member, a threaded member threadedly engaged to said sliding member at said forward end and substantially normal thereto, said threaded member positionable over said panel upon shifting of said sliding member relative to said body, and to be brought rotatively into positive engagement with the surface of said panel.

4,005,889

SECURITY DEVICE FOR WINDOWS

Cecil W. Patrick, 6920 N. 16th, Lot 156, Omaha, Nebr. 68112

Filed Dec. 12, 1975, Ser. No. 640,237
Int. Cl.² E05C *17/30*
U.S. Cl. 292—262 **1 Claim**

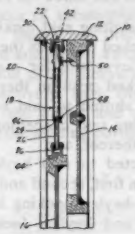
1. A security device for windows including at least a vertically movable lower window unit mounted in a window frame, comprising,

a first upstanding tube means secured at its lower end to the upper end of the lower window unit,

a second upstanding tube means slidably embracing the upper end of said first tube means and being secured at its upper end to said window frame,

said first tube means having at least one opening formed therein between its lower end and the lower end of said second tube means,

and a stop means in said opening adapted to engage the lower end of said second tube means when said lower



window unit is raised thereby limiting the upward movement of said lower window unit,

said first tube means being pivotally secured to said lower window unit,

said second tube means being pivotally secured to said window frame,

first and second U-shaped brackets being secured to said lower window unit and said window frame respectively by screws, said first tube means being pivotally secured to said first bracket, said second tube means being pivotally secured to said second bracket.

4,005,890

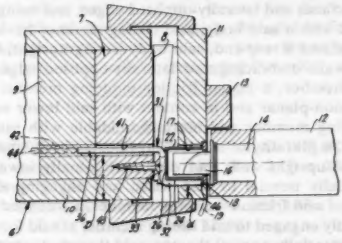
DOOR LOCK STRIKE GUARD

Robert F. Murch, Woodside, Calif., assignor to Schlage Lock Company, San Francisco, Calif.

Continuation of Ser. No. 495,851, Aug. 8, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,738

Int. Cl.² E05C *21/00*

U.S. Cl. 292—346 **1 Claim**



1. In a door lock strike guard arrangement having a frame member and a door jamb adjacent and overlying the same to define an edge of a door opening; an opening through said jamb having a side thereof adjacent one edge of said jamb and defining a strike pocket facing said door opening; an elongated opening in said frame member generally parallel to said side of said pocket but spaced therefrom in a direction away from said one edge of said jamb and being aligned with a portion of said pocket; a strike guard comprising a unitary substantially rigid strike guard member having a panel portion lying adjacent said one side of said pocket, an offset portion substantially perpendicular to said panel portion at the edge thereof nearest said frame member and spaced from said frame member, and a leg portion generally parallel to said panel portion extending from said offset portion at the edge thereof farthest from said one edge into said elongated opening and interengaging said frame member with a force fit whereby any force applied to said panel portion in a direction toward said one edge of said jamb is transmitted to and resisted by said frame member, and including abutment means on said frame member engaging and buttressing said offset portion.

4,005,891

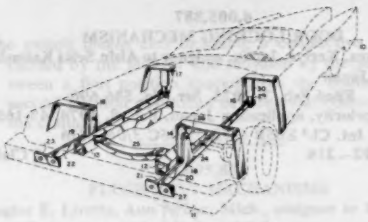
BUMPER IMPACT DIVERTOR

Theodore T. Michals, Box 71, Lyons, Ill. 60534

Filed Nov. 18, 1974, Ser. No. 524,795

Int. Cl.² B60R *19/00*

U.S. Cl. 293—84 **2 Claims**



1. A shock absorbing device for a vehicle or the like provided with a bumper and with spaced frame members, said device comprising at least one tee-shaped thrust member having a substantially horizontally disposed cross bar and a stem extending outwardly from the cross bar, means pivotally mounting the free end of the stem to a frame member for swinging movement about said pivot, means securing one end of the cross bar to the vehicle bumper, a fluid shock absorber, means securing the other end of the cross bar to one end of the shock absorber and means securing the other end of the shock absorber to the frame, said tee-shaped thrust member comprising a pair of forgings secured together and having diverging flanges at one end thereof for securement to the vehicle bumper, and diverging offsets at the other end and pivot means for securing one end of said fluid shock absorber to the thrust member between said diverging offsets.

4,005,892

DEBRIS-RETRIEVING CANE

Walter L. Williams, 5739 Camerford Ave., Los Angeles, Calif. 90038

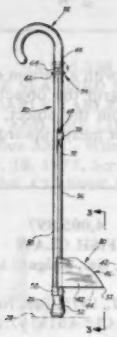
Filed June 11, 1975, Ser. No. 586,089

Int. Cl.² A01K *29/00*; A47L *13/52*

U.S. Cl. 294—1 R **5 Claims**

1. A debris-retrieving cane, comprising: a longitudinal cane shaft member effectively provided at an upper end thereof with a handle member portion and effectively provided at a bottom end thereof with a ground-surface-engageable cane tip member portion, said longitudinal cane shaft member being provided adjacent to said bottom end thereof with a hollow debris-receiving receptacle means having a ground-surface-engageable entry lip portion movable into engagement with a ground surface for positioning adjacent to a quantity of debris which is to be removed and, in such position, defining at least a portion of a receiving entry opening provided in said debris-receiving receptacle means and effectively communicating the exterior and the hollow interior thereof, said debris-receiving receptacle means being effectively positioned with respect to a lower portion of said cane shaft member in a manner capable of being placed with said ground-surface-engageable entry lip portion projecting from said cane shaft member in a direction such as to be capable of engagement with a ground surface and with said entry opening effectively open for the reception

of a quantity of debris which is to be removed; and debris movement and manipulation means for effectively moving and manipulating a quantity of debris which is to be removed along a ground surface initially supporting such debris toward the ground-surface-engaged entry lip portion for forced movement thereover and through said entry opening into said hollow interior of said debris-receiving receptacle means said debris-movement-and-manipulation means comprising a longitudinal handle portion and an effective debris-engaging spatula portion at the bottom end of said longitudinal handle portion normally mounted in longitudinal, laterally adjacent, substantially parallel relationship with respect to a corresponding longitudinal part of said longitudinal cane shaft member and provided with controllably openable and close-



able fastening means for normally fastening and retaining said longitudinal handle portion and said debris-engaging spatula portion at the bottom thereof immediately adjacent to and in longitudinal contiguous relationship with respect to said part of said cane shaft member until controllable manual unfastening thereof, said fastening means, when controllably unfastened, effectively releasing said longitudinal handle portion of said debris-movement-and-manipulation means whereby to allow said lower debris-engaging spatula portion thereof to move into a position spaced from but adjacent to and movable toward said ground-surface-engageable entry lip portion of said debris-receiving receptacle means and said entry opening defined thereabove when in the debris-receiving operative position.

4,005,893
ARTICLE GRIPPING TONGS
George Tash, 15155 Stagg St., Van Nuys, Calif. 91405
Filed Dec. 10, 1975, Ser. No. 639,292
Int. Cl.² A47J 29/06
U.S. Cl. 294—28 **10 Claims**

1. Improved article-gripping tongs, said tongs comprising, in combination:

a pair of elongated pincer members pivotably interconnected and each having handle means adjacent one end thereof and an article-gripping arm depending from the opposite end thereof,

said arms consisting of a lower portion and an upper portion;

said upper and lower portions of said arms being integral with one another;

said lower portion of said arms and said handle means substantially lying in a first plane;

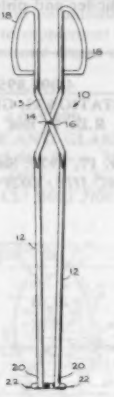
said upper portion of each of said arms lying in a second plane which is at an angle to said first plane;

one of said arms and its associated handle means lying in a third plane;

the remaining arm and its associated handle means lying in a fourth plane;

said third and fourth plane lying at an angle with respect to one another;

whereby one end of the upper portions of said arms generally converge towards one another and the opposite end of the upper portions of said arms generally diverge away from one another, such that upon closing of said tongs,

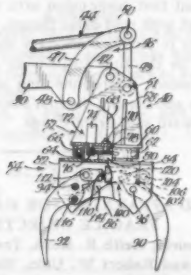


the said one ends initially contact one another while said opposite ends initially are simultaneously displaced from one another;

said arms being made from a flexible, elastic material whereby said opposite ends can be moved closer to one another while said one ends are maintained in contact with one another; and,

grip increasing means disposed on each of said upper arm portions.

4,005,894
LOG GRAPPLING APPARATUS
Frank J. Tucek, Wausau, Wis., assignor to J. I. Case Company, Racine, Wis.
Filed Oct. 16, 1975, Ser. No. 623,009
Int. Cl.² B66C 3/16
U.S. Cl. 294—88 **1 Claim**



1. A heel boom log grappling apparatus comprising an upper frame adapted to be attached to a boom on a vehicle, a lower frame rotatably supported about an axis on said upper frame, drive means between said frames for rotating said frames relative to each other, a pair of grapple heels fixed to said lower frame at spaced locations on opposite sides of said axis, first and second rods extending between said heels and located on opposite sides of said axis, first and second grapple arms respectively pivoted on said first and second rods be-

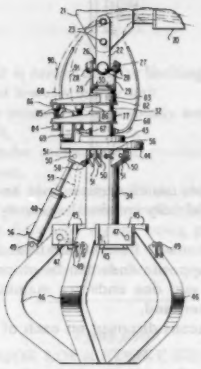
tween said spaced grapple heels, and power means between said lower frame and grapple arms for pivoting said arms so that a log may be gripped between said arms and held in engagement with said grapple heels, said power means including a rigid synchronizing link having opposite ends respectively connected to said arms at locations spaced from the pivotal connections for said arms on said lower frame, and a fluid motor including a cylinder and piston rod with one of said cylinder and piston rod connected to one of said arms and the other of said cylinder and piston rod connected to said lower frame.

4,005,895

ROTATIONAL GRAPPLE

Harold L. Cullings, R.D. 1, Box 66, McConnellsburg, Pa. 17233

Filed Nov. 17, 1975, Ser. No. 632,667
Int. Cl.² B66C *3/16*; E02F *3/44*; B66C *1/04*
U.S. Cl. 294—65.5 **20 Claims**



1. A rotational drive assembly comprising a relatively stationary member and a rotational member having swiveled engagement with said relatively stationary member, a drive flange on the rotational member, a first suspension arm on said relatively stationary member above the drive flange of the rotational member and held against rotation around the axis of the relatively stationary member while being free to shift longitudinally thereof, a pressure fluid operated motor wheel journaled on said first suspension arm and having a tire in frictional contact with said drive flange, a second suspension arm fixed on the relatively stationary member in spaced opposing relation to the first suspension arm, and adjustable tension spring means interconnecting said first and second suspension arms and biasing the first suspension arm with said motor wheel toward said drive flange.

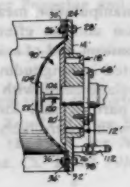
4,005,896

METHOD AND APPARATUS FOR HANDLING LARGE, FRAGILE OBJECTS

Glen A. Ball, Peoria; Keith E. Koch, Tremont; Ivan R. Lamport, Peoria, and Robert W. Untz, Hanna City, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 434,983, Jan. 21, 1974, Pat. No. 3,915,311. This application Oct. 6, 1975, Ser. No. 620,074
Int. Cl.² B66C *1/00*
U.S. Cl. 294—67 BA **3 Claims**

1. Apparatus for selectively gripping an object comprising: wall means positionable generally about the object; means associated with said wall means and movable inwardly thereof to engage a portion of the outer surface of said object to thereby grip the object, with the wall means so positioned; and means for selectively moving said movable means inwardly of said wall means; wherein said movable means comprise diaphragm means, wherein the means for selectively moving the diaphragm means inwardly of the wall means comprise plunger means associated with the wall means and movable inwardly of the object to move a portion of the diaphragm



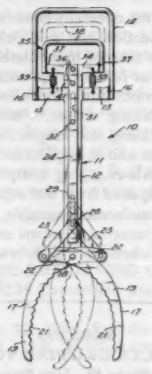
means into engagement with a portion of the outer surface of the object, to thereby grip the object, said plunger means being movable away from the object, and means for selectively moving the plunger means inward of and away from the object.

4,005,897

FISH CLAW

Joel E. Smith, Reidsville, Ga., assignor to Joel E. Smith, Reidsville, Ga.

Filed July 21, 1975, Ser. No. 597,365
Int. Cl.² A01K *97/14*
U.S. Cl. 294—115 **1 Claim**



1. A hand-operated device for handling a captured fish comprising an elongated flat shank, a pair of opposed jaws pivotally mounted at a common point on a forward end of the shank, the jaws each having a main gripping portion extending generally forwardly of the pivot point and an integral lever arm extending parallel to the plane of the shank generally transversely of the forward gripping portion, said jaws being mounted on opposite sides of the shank, each in abutting contact with the adjacent face of the shank, a pair of flat control rods on opposite sides of the shank, said control rods each being in abutting contact with an adjacent face of the shank and being coplanar with an associated jaw, a flat link pivotally connected between the forward end of each control rod and the distal end of the adjacent jaw lever arm, each link being disposed in a plane overlying the plane of the associated jaw and control rod, a hand grip carried on the rearward ends of the control rods, said hand grip including a portion inter-

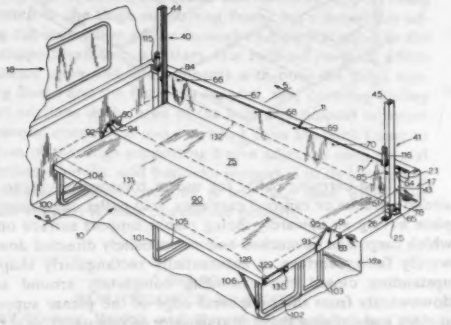
posed between the rearward control rod ends and coplanar with the shank, a pair of longitudinally spaced pins retaining said control rods in fixed relation therebetween with a clearance spacing permitting said control rods to slide longitudinally of the shank, said shank having a pair of spaced longitudinal slots for movement of said pins during movement of said control rods, a forward one of said pins providing the pivotal connection of said links to their associated control rods, a pair of tension springs connected between said hand grip and said shank and symmetrically spaced about the line of movement of said control rods, said springs biasing said jaws to their open position, a portion of said hand grip being in abutting engagement with said shank when said jaws are in their open position, the main gripping portion of said jaws having an arcuate configuration and being arranged to overlap when said jaws are closed.

4,005,898

CONVERTIBLE SEAT/BED STRUCTURE AND ASSOCIATED FOLDABLE TABLE FOR PICKUP TRUCKS AND THE LIKE

Lee V. Way, Rte. 3, Box 333C, Wilmington, N.C. 28401

Filed Mar. 18, 1975, Ser. No. 559,568
Int. Cl.² B60P 3/34
U.S. Cl. 296—23 R **11 Claims**



1. A seat/bed assembly usable singly and in pairs and selectively foldable for use as a seat or bed in a pickup truck, camper, and like vehicle having opposed upright sidewalls and a floor between the sidewalls, each such assembly comprising:

a. support means providing a pair of laterally spaced, vertical tubular guide members secured to a selected sidewall of the vehicle;

b. a first rectangular frame member having a supportive surface and having mounted adjacent one side edge thereof a pair of guide connectors adapted to travel on said guide members adapting the said side edge of said first frame member to be retained and move vertically thereon and said frame member to pivot thereon for assuming selected stored and seat back positions in which said first frame member side edge is elevated on said guide members and said supportive surface is brought to an upright, outwardly facing position and when desired a bed position in which said first frame member side edge is lowered on said guide members and said supportive surface is upwardly facing and disposed horizontally;

c. a second rectangular frame member having a supportive surface and hinge means hingedly connecting one of its side edges to the other side edge of said first frame member for pivoting between an unfolded position in which the supportive surface thereof is horizontal and facing upwardly for use as a seat or bed surface and another folded position in which the supportive surface thereof is brought to an upright position facing the supportive surface of the first frame member for storage; and

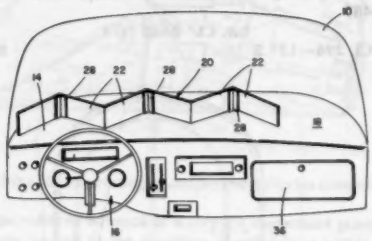
d. folding leg means connected to said second frame member to support the same on the floor of the vehicle when in its said unfolded seat and bed positions, said folding leg means including at least one pair of leg means extending perpendicular to the side and each member of the pair of being at the same distance longitudinally from an end of the floor and having one member of the pair adapted to be folded to accommodate to tire well intrusions, and the like, when said second frame member assumes its seat position and adapted to be unfolded adjacent the other member of the pair to supplement the support provided thereby when said second frame member is in its bed position.

4,005,899

AUTOMOBILE ANTI-GLARE SHIELD

John T. Rigney, 6548 Parkdale Plaza, Martinez, Calif. 94553

Filed July 28, 1975, Ser. No. 599,515
Int. Cl.² B60J 3/00
U.S. Cl. 296—97 E **11 Claims**



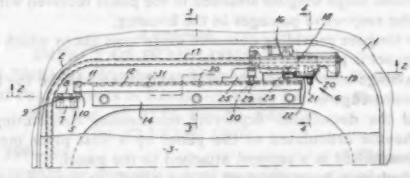
11. In combination, an automobile having a passenger compartment; a windshield separating the compartment from an exterior of the automobile; and dashboard disposed in the compartment beneath the windshield and including a generally horizontal surface extending over a major portion of the length of the windshield; and an anit-glare shield carried by and loosely positioned on the horizontal dashboard surface, the anti-glare shield having a height substantially less than a height of the windshield, an overall length many times greater than its height, and a longitudinally undulating configuration so that the glare shield is self-supporting on and freely removable from the horizontal dashboard surface.

4,005,900

VEHICLE ROOF WITH MOVEABLE PANEL

Axel Rauthmann, Dansweiler, and Erwin Spiegel, Quadrath-Ichendorf, both of Germany, assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 3, 1976, Ser. No. 654,813
Claims priority, application Germany, Mar. 21, 1975, 2512426
Int. Cl.² B60J 7/04
U.S. Cl. 296—137 B **8 Claims**



1. A vehicle roof having a panel arranged inside a roof aperture, which panel can be upwardly deployed at its rear edge and can, if required, be detached completely,

a roof frame framing the aperture,

the panel being attached to the roof frame at its forward edge through at least two hinge devices and at its rear edge through deploying mechanisms comprising two lateral lever arms movable to deploy the rear edge of the panel out of the aperture,

wherein the improvement comprises:

connecting means coupling the hinge devices and the deploying mechanisms to lateral locating components extending parallel to lateral edges of the aperture,

the locating components receiving guides attached to the panel,

the guides being disconnectable from the locating components to permit removal of the panel from the roof aperture.

4,005,901

VEHICLE ROOF WITH A MOVABLE PANEL

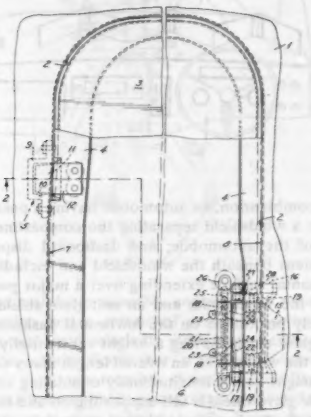
Helmut Lutke, Buttgen-Driesch, and Willi Schalude, Geyen, both of Germany, assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 23, 1976, Ser. No. 651,879

Claims priority, application Germany, Feb. 27, 1975, 2508487

Int. Cl.² B60J 7/18

U.S. Cl. 296—137 B **9 Claims**



1. A vehicle roof having a movable panel arranged in a framed roof aperture,

the rear edge of the panel being deployable outwardly of the aperture and facility being provided for the complete detachment of the panel from the roof frame,

the front edge of the panel being attached to the roof frame through spaced hinge components and the rear edge through a detachable deploying mechanism,

wherein the improvement comprises the detachable hinge components constituting fixed hinge housings attached to the roof frame,

each housing containing a circular arcuate passage,

flexible hinge tongues attached to the panel received within the respective passages in the housing,

the tongues providing common hinge axes about which the panel is pivotally moveable,

the hinge axes being located in front of and above the forward edge of the panel,

and the detachable deploying mechanism constituting a handle articulated to the panel by a first pivot means journalled in a support attached to the panel,

a deploying lever attached to the handle to form a toggle link,

the deploying lever being articulated by a second pivot means to the roof frame through a support forming a bearing therefore,

one of the pivot means being disengageable from its support to provide for disconnection of the detachable deploying mechanism.

4,005,902

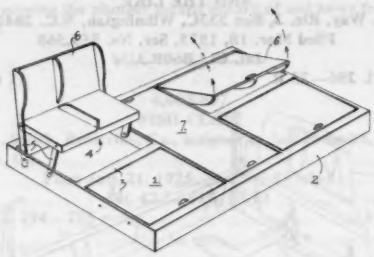
LOAD CARRYING PALLET

Chaim Balin, 7 Harel St., Ramat Chen, Israel

Filed Feb. 28, 1975, Ser. No. 554,109

Int. Cl.² A47C 4/00; A65D 19/00

U.S. Cl. 297—129 **5 Claims**



1. A load-carrying pallet for use in transporting cargo in aircraft, trucks or railroad carriages, said pallet comprising a plate having an upwardly facing planar support surface onto which cargo can be stacked and an oppositely directed downwardly facing surface, a substantially rectangularly shaped upstanding closed rim extending completely around and downwardly from the peripheral edge of the planar support surface and defining the lateral exterior of said pallet, said rim having an upper edge in the plane of said planar support surface of said plate and a lower edge spaced downwardly below said upper edge and below said downwardly facing surface of said plate with said rim presenting a continuous surface between its upper and lower edges with the upper edge of said rim extending continuously around said rectangular shaped rim, said rim defining a shallow depression below the downwardly facing surface of said plate, said plate comprising upstanding ribs located within the shallow depression and extending interiorly of and across said rim with the upper edges of said ribs being flush with the upper edge of said rim, and said plate also including panels having an upper surface and a lower surface with the upper surface of said panels being flush with and disposed between the upper edges of said rim and said ribs and the lower surface being spaced downwardly from said upper surface, hinge means connecting said panels to at least one of said rim and said ribs so that said panels can be displaced between a folded position with the upper surface of said panels being flush with the upper edges of said rim and ribs and an open position with said panels extending upwardly from the upper edges of said rim and ribs, seat members hinged to said panels and displaceable therewith between the folded and open positions so that in the folded position said seat members are located in said shallow depression below said panels and the surface forming the lower surface of said panels in the folded position forms the back of a seat in the open position and said seat members in the open position extend generally normal to the lower surface of said panels forming a seating surface with said seat members in the open position spaced above the upper edges of said rim and ribs.

4,005,903

SEAT WITH AN ADJUSTABLE BACK

Albert Jenni, Schaftmuttweg 92, Binningen, Switzerland (CH-4102)

Filed Sept. 4, 1975, Ser. No. 610,490
Claims priority, application Switzerland, Sept. 6, 1974, 12182/74
Int. Cl.² A47C 1/02
U.S. Cl. 297—328 2 Claims

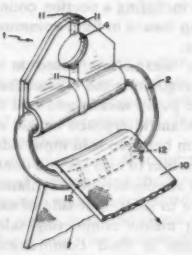
1. An adjustable seat comprising a supporting structure, a thigh supporting frame which is rigidly connected to said supporting structure, a buttocks support which is pivotally connected to said supporting structure by laterally spaced pivotal connections, a back frame rigidly affixed to said buttocks support at an angle thereto, said buttocks support being connected to the thigh supporting frame by a means for adjusting the inclination of the buttocks support relative to the thigh supporting frame, a unitary, taut resilient covering which is disposed upon and interconnects with both the thigh supporting frame and the buttocks support, said covering having cut out portions in the area of the buttocks support adjacent each pivotal connection and extending from the back frame to a portion of the thigh supporting frame adjacent each pivotal connection whereby said buttocks support is in its lowermost position said resilient covering is less taut than when said buttocks support is in its uppermost position.

4,005,904

RUN THROUGH BRACKET

Per Olof Weman, Hasloh, and Harald Martin Schmelow, Elerau, Krs. Segeberg, both of Germany, assignors to Sigmatex A.G., Geneva, Switzerland

Filed June 24, 1975, Ser. No. 589,989
Int. Cl.² B60R 21/10
U.S. Cl. 297—389 4 Claims



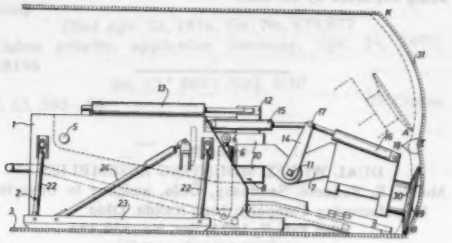
1. Guide for a safety belt for a vehicle, comprising a lashing, a ring held by the lashing, said ring having an opening through which the belt runs and being provided with a plurality of guide surfaces at least over a portion thereof which engages the belt running therethrough, said lashing having a hole therein for attachment to the vehicle, and protuberance means located adjacent said hole on at least the side of said lashing which lies against said vehicle, said protuberance means comprising elongated detent means protruding from the surface of said side and extending generally from adjacent said hole toward said ring.

4,005,905

EXCAVATING MACHINE

Michel Dubois, Ittre, Belgium, assignor to Linden-Alimak AB, Skelleftea, Sweden

Filed Aug. 21, 1974, Ser. No. 499,578
Claims priority, application Luxembourg, Aug. 22, 1973, 68289
Int. Cl.² E21D 9/10
U.S. Cl. 299—31 50 Claims



1. A machine for excavating underground galleries comprising

a frame movable to advance in a forward movement generally along an axis in the direction of excavation within a gallery which is being excavated,

tool carrying arm means,

pivotal connecting means for connecting said arm means to said frame for vertical swinging movement,

means for adjusting the orientation of said arm in a plurality of directions with respect to a vertical plane,

said arm means including a rotary tool carrier supported thereon and provided with cutting tools distributed over the periphery thereof and positioned to operate in a plane perpendicular to the direction of said arm,

means for rotating said rotary tool carrier,

means for moving said pivotal connecting means to occupy at least two alternative positions above the floor of the gallery being excavated having different displacements transverse to said axis in the direction of excavation to thereby provide for excavation at different ranges of transverse displacement,

said pivotal connecting means including operable for imparting said vertical swinging movement to said arm means during excavation rotation of said rotary tool carrier in each of said alternative positions of said pivotal connecting means to thereby provide a vertical swinging excavating movement from each of said positions.

4,005,906

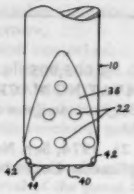
IMPACT OR DEMOLITION TOOL

Robert J. McKenry, Windber, and Michael A. College, Everett, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Dec. 15, 1975, Ser. No. 640,686
Int. Cl.² E21C 13/00
U.S. Cl. 299—91 5 Claims

1. An impact or demolition tool comprising; a steel rod having a working portion at one end and a portion at the other end adapted for being gripped by a driver, said working portion tapering inwardly on opposite sides toward the outer end to form a wedge, and a flat outer end at the small end of said

wedge, and a plurality of hard wear resistant inserts extending into said working portion in spaced distributed relation and



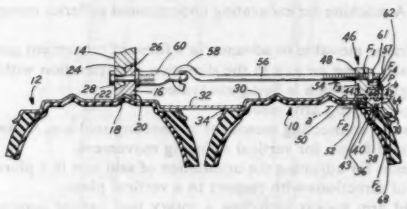
having the outer ends disposed for engagement with work being impacted by the tool.

4,005,907

DUAL WHEEL MOUNTING ASSEMBLIES

Melvin E. Bonomo, Sandusky, Ohio, assignor to Unverferth Manufacturing Company, Inc., Kalida, Ohio

Filed Feb. 7, 1973, Ser. No. 330,195
Int. Cl.² B60B 11/02
U.S. Cl. 301—36 R **5 Claims**



1. A wheel mounting assembly for mounting an auxiliary wheel to a vehicle-mounted wheel, said assembly comprising, a rim on the auxiliary wheel, an annular stepped groove adjacent an edge of said rim opposite the vehicle-mounted wheel, wheel securing means including an annular ring positioned in said stepped groove, and a plurality of spaced lug members and rim contacting means secured to and spaced about the inner circumference of said annular ring, each of said rim contacting means having a portion thereof extending beyond said ring and in overlying and contacting relationship with the rim of said auxiliary wheel between said stepped groove and the vehicle-mounted wheel, connecting means adapted to be attached at one end to the vehicle-mounted wheel and at its other end to said lug members, and tension means for drawing tension on said connecting means to firmly attach the wheels together, wherein the improvement in said assembly includes means in combination therewith for relieving stresses on said auxiliary wheel rim and said ring, said stress relieving means including:

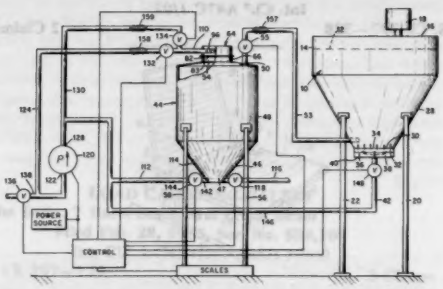
means for exerting a counterbalancing force on said securing means in a direction toward the rim of said auxiliary wheel, said force counterbalancing the forces exerted upon the rim by said rim contacting means and upon the ring and which tend to deform said rim and ring in opposed directions when said auxiliary wheel is attached to said vehicle-mounted wheel, said means for exerting said counterbalancing force comprising a plurality of spokes in the annular opening of the rim of said auxiliary wheel, said spokes bracing said securing means between first points adjacent said lug members and second points angularly displaced from said first points about the rim of said auxiliary wheel.

4,005,908

BATCH TRANSFER SYSTEM

Billy P. Freeman, P.O. Box 245, Blaine, Tenn. 37709

Filed Feb. 3, 1975, Ser. No. 546,422
Int. Cl.² B65G 53/28
U.S. Cl. 302—3 **7 Claims**



1. In a system for pneumatically transferring particulate material in batches from a first location to a second and remote location the combination comprising

a first vessel for containing a quantity of said particulate material, said first vessel including a substantially conical bottom section having its apex directed downwardly and defining an opening therein,

a porous member covering said opening and defining a plurality of passageways therethrough,

a second vessel chargeable with and dischargeable of said particulate material and having a top section and a substantially conical bottom section having its apex directed downwardly,

first conduit means connecting said bottom section of said first vessel with said top section of said second vessel, said first conduit directing the flow of pneumatically entrained particulate material therethrough from said first vessel to said second vessel,

first valve means interposed in said first conduit means for regulating the flow of particulate material through said first conduit means,

filter means mounted on and in fluid communication with said top section of said second vessel and substantially prohibiting the movement of said particulate material therepast,

gas pump means having an input side and an output side,

second conduit means connecting said input side of said pump means in fluid communication with said filter means and including a portion connecting said input side of the pump means in fluid communication with ambient atmosphere,

second valve means interposed in said second conduit means for regulating the flow of fluid between said input side of said pump means and said filter means,

third valve means interposed in said second conduit means at a location between said input side of said pump means and that portion of said second conduit means that opens to ambient atmosphere for regulating the flow of ambient atmosphere to said input side of said pump means,

third conduit means connecting said output side of said pump means in fluid communication with said filter means,

fourth valve means interposed in said third conduit means for regulating the flow of fluid through said third conduit means,

fourth conduit means connecting said output side of said pump means in fluid communication with said porous member covering said bottom opening in said first vessel,

fifth valve means interposed in said fourth conduit means for regulating the flow of fluid through said fourth conduit means,

a fifth conduit directly connecting said output side of said pump means in fluid communication with one side of said conical bottom section of said second vessel adjacent the lowermost portion thereof for injecting pressurized fluid from said output side of said pump means into said bottom section of said second vessel for entraining particulate material from said second vessel in said fluid and conveying the same from said bottom section at a location substantially diametrically opposed to the location of the connection of said fifth conduit to said bottom section of said second vessel to a location remote from said second vessel,

sixth valve means interposed in said fifth conduit and adapted to regulate the flow of fluid through said fifth conduit,

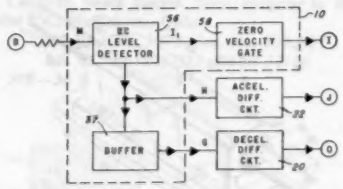
means controlling the functioning of each of said valve means in a sequence providing cyclical withdrawal of fluid from said second vessel by said pump means with concomitant withdrawal of particulate material from said first vessel into said second vessel with at least a substantial portion of said withdrawn fluid being conveyed under pressure through said fourth conduit means and said porous member into the bottom section of said first vessel, and subsequent flow of fluid under pressure from said output side of said pump means to said top of said second vessel to provide a volume of pressurized fluid above the level of particulate material within said second vessel and flow of fluid under pressure through said fifth conduit into said bottom section of said second vessel to entrain particulate material from said second vessel and transfer the same out of said second vessel.

4,005,909

DC LEVEL DETECTOR AND ZERO VELOCITY GATE CIRCUIT FOR USE IN A VEHICLE SKID CONTROL BRAKING SYSTEM

James J. Jones, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed July 3, 1972, Ser. No. 268,398
Int. Cl.² B60T 8/08
U.S. Cl. 303—91 8 Claims



1. In a vehicle skid control braking system of the type that selectively controls the engagement and disengagement of the braking system of a vehicle in accordance with selected braking conditions, a DC level detector and zero velocity gate circuit comprising in combination:

first signal means responsive to a first signal in the form of a varying DC signal representing the wheel speed of the vehicle for generating second and third signals proportional to said first signal, said first signal means including detector means for eliminating undesirable ripple characteristics of said first signal;

second signal means responsive to said third signal for genrating a fourth signal when said first signal reaches a selected value;

third and fourth signal means respectively responsive to first and second conditions of said second signal for generating fifth and sixth signals respectively representing first and second conditions of the wheel speed of the vehicle;

buffer circuit means for eliminating undesirable characteristics of said second signal to provide a seventh signal which is coupled to said fourth signal means;

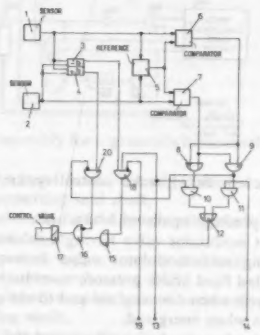
said first signal means comprising a differential amplifier having first and second transistors with commonly connected emitter regions, said first transistor having a base region coupled to said first varying DC signal and said second transistor having a base region coupled to an input signal having a magnitude of said selected value, and said common emitter regions being coupled to circuit ground and to said buffer circuit means.

4,005,910

ANTILOCKING CONTROL SYSTEM

Heinz Leiber, Leimen, and Werner Weber, Nussloch, both of Germany, assignors to Teldix G.m.b.H., Heidelberg, Germany

Filed Apr. 23, 1976, Ser. No. 679,877
Claims priority, application Germany, Apr. 24, 1975, 2518196
Int. Cl.² B60T 8/02, 8/10
U.S. Cl. 303—96 28 Claims



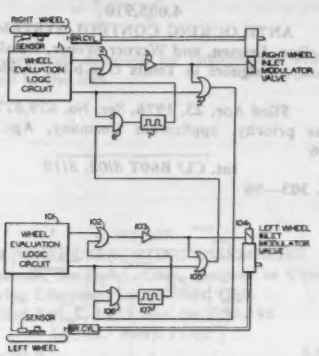
1. In an antilocking control system for the wheel brakes of a vehicle including a pressure regulating unit for commonly regulating the pressure in the brakes of at least two wheels of the vehicle, sensor means for producing output signals corresponding to the rotational behavior of the wheels whose brakes are being regulated, and evaluation and control circuit means responsive to the output signals from said sensor means for producing control signals for said pressure regulating means to cause same to regulate the pressure, said control signals being selectively based either on the rotational behavior of the wheel first tending to lock (select-low) or on the rotational behavior of the wheel which is the last to show a tendency to lock (select-high), the improvement wherein said evaluation and control circuit means includes: first means effective during the select-low mode of operation for measuring the time duration (T_1) of the pressure buildup phase following a pressure reduction phase until there again occurs a tendency to lock at at least one wheel; switching means responsive to the occurrence of a signal indicating a tendency to lock for switching the mode of operation to select-high; second means for measuring the time duration (T_2) of the pressure increase period during said select-high mode of operation and for continuously comparing the result with the measured time duration (T_1) of the pressure buildup phase during select-low operation; control means responsive to the measured time duration T_2 having reached a given relationship to the previously measured time duration T_1 for effecting continuation of the select-high mode of operation for a given time duration T_3 and then switching the mode of operation back to the select-low mode of operation; and switch-back means responsive to an indication, during select-high operation, that the second wheel also shows a tendency to lock before a given time duration T_3 has been reached for effecting a switch-back to the select-low mode of operation.

4,005,911

INDIVIDUAL WHEEL ANTISKID BRAKE CONTROL SYSTEM ARRANGED TO PREVENT EXCESSIVE BRAKE PRESSURE DIFFERENCES

Alfred Klatt, Wathlingen; Klaus Lindemann; Dieter Luhdorff, both of Hannover, and Erich Reinecke, Beinhorn, all of Germany, assignors to WABCO Westinghouse GmbH, Hannover, Germany

Filed Oct. 6, 1975, Ser. No. 619,693
Int. Cl.² B60T *8/02, 8/26*
U.S. Cl. 303—111 **3 Claims**



1. A vehicle antiskid brake control system comprising for each wheel:

a. a fluid pressure operated brake unit;

b. an inlet modulator valve having a solenoid operator for operating said modulator valve to establish operator controlled fluid brake pressure communication with said brake unit when deenergized and to cut-off said communication when energized;

c. wheel sensing means for monitoring the dynamic condition of the wheel to provide at least one wheel behavior signal when the wheel exhibits a skidding tendency;

d. logic means subject to said at least one wheel behavior signal for evaluating the dynamic condition of the respective wheel and for providing first and second output signals accordingly;

e. a pulse generator for emitting a pulsed output signal, said first output signal or said pulsed output signal providing a control signal that is connected to said modulator valve solenoid operator to control energization thereof, said pulse generator of each one of a pair of wheels being activated responsive to said control signal being present at the other one of the pair of wheels only when said second output signal at said one of the pair of wheels is absent.

4,005,912

LOW GROUND PRESSURE TRACK SHOE

Danny J. Becker, Peoria; Roger L. Boggs, East Peoria; Kennith E. Vaughn, Creve Coeur, and James Richard Shuler, Eureka, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 517,495, Oct. 24, 1974, Pat. No. 3,937,529. This application Aug. 18, 1975, Ser. No. 605,693
Int. Cl.² B62D *55/28*
U.S. Cl. 305—13 **8 Claims**

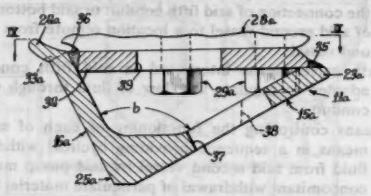
1. The combination comprising

a track shoe including a pair of downwardly converging sidewalls forming a trough-like construction having a V-shaped cross section at least substantially throughout the entire width thereof,

a common grouser portion formed at lower apex ends of said sidewalls to extend the entire width of said track shoe,

generally horizontally disposed first and second lugs each formed on an upper end of a respective one of said sidewalls to extend the entire width of said track shoe, the first lug of said track shoe adapted to overlap a second lug of another adjacent track shoe,

link means disposed between lateral ends of said track shoe and straddling the sidewalls thereof between said first and second lugs,



attachment means, attaching said link means to said track shoes, comprising a separate support member disposed in straddling relationship between said sidewalls and secured thereto,

at least one bolt means releasably attaching said link means solely to said support member and

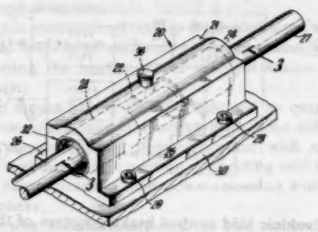
an access opening formed through at least one of said sidewalls to expose said bolt means.

4,005,913

LINEAR MOTION BEARING BLOCK

John B. Thomson, Jr., Sands Point, N.Y., assignor to Thomson Industries, Inc., Manhasset, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,389
Int. Cl.² F16C *17/00*
U.S. Cl. 308—6 C **17 Claims**



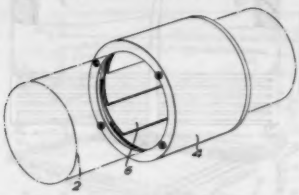
1. A linear motion bearing block, adapted for relative axial movement on a shaft, which comprises: an elongated housing mount having a longitudinally extending bore adapted to receive said shaft; a plurality of linear motion ball bearings positioned coaxially within the bore of said housing mount in spaced-apart relationship, said bearings being adapted to slidably engage said shaft; each of said linear motion ball bearings including a ball retainer defining a plurality of raceways, each of said raceways having a load-bearing portion and a load-free portion and substantially filled with balls which recirculate in said raceways; load-carrying plates positioned adjacent each of said load-bearing portions of each of said raceways; means for permitting relative angular movement between each of said bearings and said housing mount; means for radially preloading said load-carrying plates; and, sealing means cooperating with said bearings and housing mount to form a lubricant reservoir in said bore between said spaced-apart bearings, whereby said bearings are lubricated and said shaft is wiped as it moves through said bore.

4,005,914

SURFACE COATING FOR MACHINE ELEMENTS HAVING RUBBING SURFACES

Paul Newman, Bristol, England, assignor to Rolls-Royce (1971) Limited, England

Filed Aug. 11, 1975, Ser. No. 603,604
Claims priority, application United Kingdom, Aug. 20, 1974, 36637/74
Int. Cl.² F16C *35/00*
U.S. Cl. 308—9 7 Claims



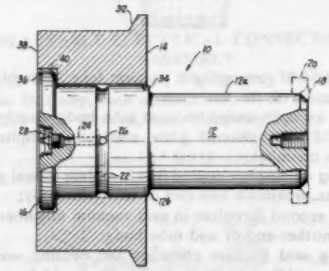
1. A machine element comprising a relatively rigid component and a relatively flexible component adapted for relative rotation and wherein the relatively rigid component is provided with a surface layer of a glaze-forming oxide between 0.003 ins. and 0.020 ins. thick, and the relatively flexible component is provided with a surface layer of a glaze-forming oxide between 0.0001 ins. and 0.0005 ins. thick.

4,005,915

PLAIN BEARING

Earl H. Canfield, South Euclid, Ohio, assignor to Wellington Machine Co., Wellington, Ohio

Filed June 30, 1975, Ser. No. 592,027
Int. Cl.² B61F *17/22*; B60B *37/10*
U.S. Cl. 308—36 R 3 Claims



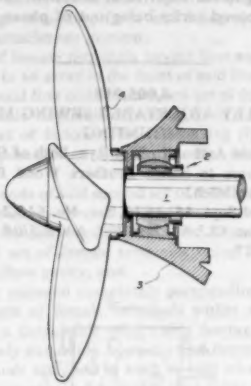
1. A plain bearing assembly comprised of a steel bearing member and a steel rotatable member in sliding contact with the bearing member, said assembly constructed to operate at low speed and under heavy load with little or no lubrication, each said plain bearing member having a surface of revolution that slidingly engages a surface of revolution of the other for relative rotation, each said surface of revolution having an oxide surface layer on a nitrided case, said oxide layer of each member being formed by steam tempering said surfaces of revolution of the members subsequent to nitriding.

4,005,916

JACKED HYDROSTATIC BEARING

Richard H. F. Dillon, 257 Lisgar St., Apt. 1001, Ottawa, Ontario, Canada (K2P 0C7)

Filed Nov. 7, 1975, Ser. No. 629,886
Int. Cl.² F16C *1/24*
U.S. Cl. 308—36.1 14 Claims



1. A bearing assembly for a generally horizontal shaft which comprises,

a cylindrically faced lower bearing shell for cooperating with and supporting said shaft,

a pair of cylindrically faced upper bearing shells for cooperating with this shaft,

lower bearing shell support means cooperating with and supporting said lower bearing shell,

upper bearing shell support means cooperating with said upper bearing shells,

means for leading bearing fluid under pressure to the cylindrical faces of said lower and upper bearing shells respectively,

said upper bearing shell support means comprising means for urging the cylindrical faces of said upper bearing shells against said shaft and for urging said shaft against said lower bearing shell, said urging means comprising cooperating piston and cylinder means on said upper bearing support means and said upper bearing shells,

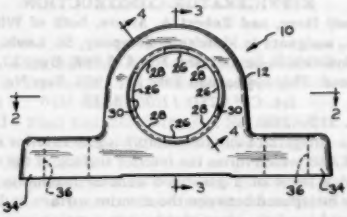
and means for introducing liquid under pressure into said cylinder means.

4,005,917

PILLOW BLOCK AND APPARATUS FOR MAKING SAME

Ralph G. Richardson, and William J. Vitron, both of Fairview, Pa., assignors to Hoover Ball and Bearing Company, Saline, Mich.

Filed Oct. 22, 1975, Ser. No. 624,917
Int. Cl.² F16C *9/06*
U.S. Cl. 308—72 7 Claims



1. A pillow block for supporting a bearing which has an

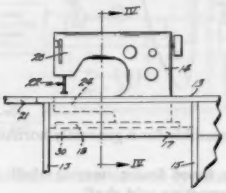
outer race with a truncated spherical outer wall, said pillow block comprising a onepiece rigid foam plastic body member having a bearing seat of a generally spherical shape for receiving the outer wall of said bearing and for retaining the bearing against radial and axial displacement, said bearing seat having a first series of intermittent spherical segments facing in one axial direction and a second series of intermittent spherical segments facing in the other axial direction, the segments of the first and second series being out of phase with one another.

4,005,918

VERTICALLY ADJUSTABLE SEWING MACHINE MOUNTING

James Smith, and Arthur L. Van Ryn, both of Grand Rapids, Mich., assignors to Smith Brothers Wood Products Inc., Grand Rapids, Mich.

Filed Sept. 15, 1975, Ser. No. 613,248
Int. Cl.² A47B *81/00*; A47F *5/08*
U.S. Cl. 312—27 **38 Claims**



1. In a storage cabinet having means for mounting a sewing machine for positioning between working positions and a storage position the improvement comprising: said mounting means being shiftable from a sewing machine storage position to first and second sewing machine working positions, said mounting means including: a first member positionable at a first elevational position relative to the top surface of the cabinet and a second position below the top surface of the cabinet; said first member being disposed substantially parallel to said cabinet top surface in both such positions and sufficiently close to such surface to dispose at least the upper portion of a sewing machine carried on said member above the said surface in both of said first and second positions, a second member hingedly affixed to said first member; means pivotally mounting said second member in said cabinet, said second member being pivotal between a first generally vertical position, a second position relatively parallel to said first member when said first member is in said second position, and a third position angularly disposed with respect to said first member when said first member is in said first position; and means associated with said first and second members for releasably retaining said first and second members in their said respective first and second positions.

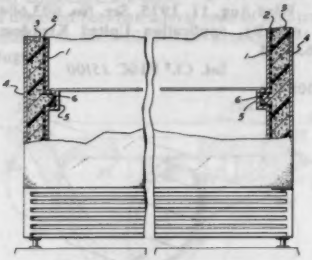
4,005,919

REFRIGERATOR CONSTRUCTION

A. Russell Hoge, and Robert A. Myers, both of Wilbraham, Mass., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 535,548, Dec. 23, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 661,908
Int. Cl.² F25D *11/00*; B32B *3/26*
U.S. Cl. 312—214 **14 Claims**

1. In a refrigerator cabinet comprising an exterior surface, a sheet of ABS which forms the interior surface of the refrigerator, and a layer of a gas filled cellular insulation material which is interposed between the exterior surface and the ABS sheet, said insulation material having a major amount of its cells filled with a halogenated aliphatic or cycloaliphatic hydrocarbon, the improvement which comprises using an ABS sheet which has bonded thereto a coextensive sheet of a rubber-modified high nitrile polymer wherein the rubber-modified high nitrile polymer is facing the exterior surface and is in laminated contact with the foam in the refrigerator cabinet



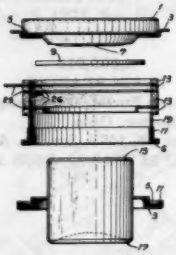
wherein the rubber-modified high nitrile polymer contains from 45 to 85 percent by weight, based on the total polymer weight, of a nitrile monomer unit and from 5 to 30 percent by weight of a synthetic or natural rubber component.

4,005,920

VACUUM-TIGHT METAL-TO-METAL SEAL

Jack D. Wimmer, Roanoke, Va., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed July 9, 1975, Ser. No. 594,376
Int. Cl.² H01J *9/18*
U.S. Cl. 316—19 **12 Claims**



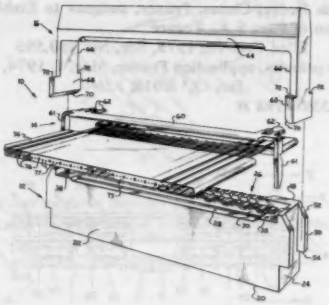
1. A method of processing a vacuum tube assembly comprising the steps of:
- enclosing an open-ended vacuum tube body member containing a microchannel plate electron multiplier in a vacuum chamber;
- positioning a phosphor coated first faceplate in said vacuum chamber proximate one end of said tube body;
- placing a second faceplate in said vacuum chamber proximate another end of said tube body;
- evacuating said vacuum chamber and heating said body member, said microchannel plate, and said faceplate to remove adsorbed gases from said body, microchannel plate and said faceplates;
- moving said first faceplate into contact with said one end of said tube body;
- sealing said first faceplate to said one end of said tube body;
- moving said second faceplate into contact with said other end of said tube body;
- sealing said second faceplate to said other end of said tube body to provide a vacuum-tight assembly; and
- removing said vacuum tube assembly from said vacuum chamber.

4,005,921

TRANSMISSION CABLE CONNECTOR AND TERMINATION METHOD

Edward Leal Hadden, Mechanicsburg, and Robert Franklin Evans, New Cumberland, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 23, 1976, Ser. No. 660,180
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 R **13 Claims**



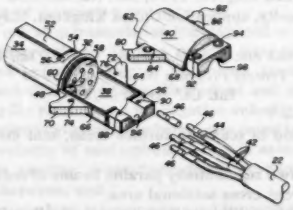
7. An electrical connector assembly comprising a flat, insulated, multi-conductor transmission cable having a plurality of signal conductors and one or more shield conductors for each signal conductor, an insulating body having a cable terminating end and a mating end, a plurality of terminals mounted in said body extending from said cable terminating end to said mating end, a bus strip engaged with said cable terminating end over an insulated end of said cable, and a cover engaged with said insulating body; said conductor terminating end of said body having a face including a central ribbed section and a tail of each terminal extending between adjacent ribs, a parapet extending from said face adjacent said central ribbed section, said parapet including a plurality of V-shaped grooves, each V-shaped groove having a signal conductor positioned therein and a scalloped top for separating the shield conductors from the signal conductors, each signal conductor bent back along the cable in engagement with the bus strip and soldered to said bus strip, and each signal conductor soldered to a terminal tail along said face of said insulating body.

4,005,922

REPLACEABLE ELECTRICAL CONNECTOR PLUG ASSEMBLY

James G. Burkhart, Dallas; Montgomery P. Burkhart, and James D. Coley, both of Rockwall, all of Tex., assignors to Air-Tex Wire Harness, Inc., Mesquite, Tex.

Filed June 2, 1975, Ser. No. 582,975
Int. Cl.² H01R *13/10*
U.S. Cl. 339—59 M **1 Claim**



1. A replaceable electrical connector plug assembly for use in a tractor cab-trailer electrical connector system comprising:

a rigid unitary housing having a front plug portion and a rear cable attachment portion;

said rear cable attachment portion including a semicircular hollow cavity having a semicircular aperture extending through the rear end thereof and edge projections extending along the top edges of said cavity,

said rear cable attachment portion further including a rear rectangular extension, having a semicircular aperture extending therethrough in alignment with said hollow cavity semicircular apertures, and

side wings extending from and integral with said rear cable attachment portion;

a first set of female terminals having first and second ends, disposed in an array in the front of said front plug portion wherein said first ends of said first set of female terminals receive male terminals extending from a mating socket;

a second set of female terminals having first and second ends, disposed in an array in the rear of said front plug portion;

said first ends of said second set of female terminals being electrically connected to said second ends of said first set of female terminals and said second ends of said second set of female terminals being accessible from said hollow cavity, and

elastomeric material completely surrounding said first and second sets of female terminals within said front plug portion; a detachable plug cable having a plurality of wires freely extending from the end thereof;

male terminals attached to each of said wires;

an end portion of said detachable plug cable dimensioned to extend through said semicircular apertures in said hollow cavity and said rear rectangular extension for direct mechanical connection of said male terminals to said second ends of said second set of female terminals, said detachable plug cable being detachable for replacement thereof and being linearly aligned with said first and second sets of female terminals; and

a removable semicircular cover portion for said hollow cavity of said rear cable attachment portion, said cover having a semicircular aperture and edges for mating with said semicircular aperture of said hollow cavity to enclose said detachable plug cable end portion;

said cover further including a rear rectangular extension having a semicircular aperture extending therethrough in alignment with said cover semicircular aperture for mating with said semicircular aperture in said rear cable attachment rear rectangular extension to provide a strain relief for said end portion of said detachable plug cable,

side wings extending from and integral with said cover for mating with said side wings of said rear cable attachment portion, and

said edges of said cover including grooves for interfitting with said cavity edge projections, said cover being attached to said rear cable attachment portion by screws and being selectively removable to permit assembly and disassembly of said plug cable to said second ends of said second set of female terminals and providing protection for the connection between said plug cable end portion and said second set of female terminals when said cover is assembled to said rear cable attachment portion of said housing.

4,005,923

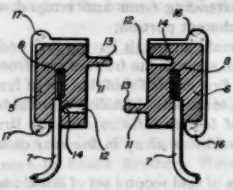
CHRISTMAS TREE LIGHTING SERIES

George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md. 20034

Filed Feb. 20, 1976, Ser. No. 659,900
Int. Cl.² H01R *11/02*
U.S. Cl. 339—157 C **5 Claims**

1. A two prong electrical connector for connecting electrical apparatus to a two conductor electrical outlet comprising, an insulating housing of two separatable halves, a connector prong mounted in and extending from each half of said housing and to which may be connected said apparatus and with

the longitudinal axes of said prongs disposed substantially parallel with each other when said connector halves are attached together, means forming at least one recess in one half of said housing, means forming at least one projection extending from the other half of said housing with the axes of said recess and projection disposed substantially transverse to the longitudinal axes of said connector prongs and with said recess



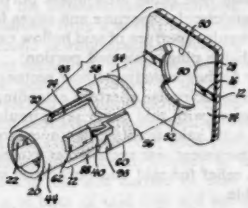
and projection positioned to engage in a manner to secure said connector halves together by movement of said connector halves in a direction substantially transverse to the longitudinal axes of said connector prongs and prevent separation of said connector halves except by movement of said connector halves along a plane lying substantially transverse to the longitudinal axes of said connector prongs.

4,005,924

UNIVERSAL WEDGE BASE LAMP SOCKET

Charles R. Nestor, Niles, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 14, 1975, Ser. No. 622,095
Int. Cl.² H05K *1/18*
U.S. Cl. 339—17 D **3 Claims**



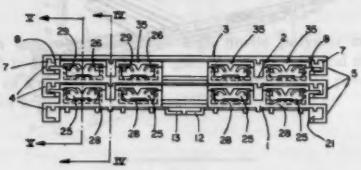
1. A printed circuit bulb socket and panel mounting assembly for connecting a bulb socket to a circuit board from either side of the board comprising: a mounting board having a circular opening with radially outer guide slots defining arcuately located index surfaces thereon, a socket housing having an outer surface for insertion through said circular opening, a first pair of locater means on said housing extending axially at only one end thereof, a second pair of locater means on the housing extending axially at only the opposite end thereof, stop surfaces formed on said first pair of axial locater means, stop surfaces formed on said second pair of axial locater means, said first pair of locater means being located in axially guided engagement with the index surfaces when said housing is inserted from one side of the board, said stop surfaces on said second pairs of locater means being engageable with the board to limit axial insertion of the housing from the one side of the board and to locate the housing for rotation with respect to the board to a locked position where the board is held between said first and second pairs of locater means, said second pair of locater means being locatable in alignment with said guide slots for axially guided insertion of the housing from the opposite side of the board with said stop surfaces on said first pair of locater means locating the housing for rotation into the aforesaid locked position with the board held between said first and second pair of locater means, terminals on said housing located in electrical contact with said board when said housing is in its rotatably locked position, said first and second pair of locater means and the stop surfaces thereon preventing movement of the housing totally through said hole upon insertion of the housing from opposite sides thereof.

4,005,925

MULTIPLE CONNECTOR

Jean-Louis Sudre, Cluses, France, assignor to Etablissements Carpano & Pons S.A., France

Filed Feb. 18, 1975, Ser. No. 550,593
Claims priority, application France, Mar. 1, 1974, 74.08411
Int. Cl.² H01R *13/40*
U.S. Cl. 339—198 H **3 Claims**



1. A multiple connector comprising a plurality of modular housing sections of insulating material and each containing at least one electrical connector, each housing section including first means cooperating with complementary second means of an adjacent housing section for slidably interconnecting the housing sections for relative sliding movement along a direction for connection and disconnection of the connectors therein with complementary connectors disposed in a corresponding array, each housing section further comprising a first stop and a second stop, the first stop being positioned relative to and cooperating with the second stop of an adjacent section to allow relative sliding of the sections between a first position with all the sections positioned for simultaneous connection of all the connectors therein with said array of complementary connectors and a second position defined by contacting coaction of said first and second stops at which one housing section remains at its first connection position and an adjacent section is displaced relative to said one housing section by an amount sufficient to ensure disconnection of the at least one connector therein from the array of corresponding complementary connectors.

4,005,926

SCANNING DEVICE

Denis Manktelow Neale, and Michael Gordon Throssell, both of Ilford, England, assignors to Ilford Limited, Ilford, England

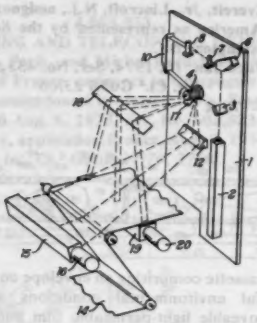
Filed May 10, 1974, Ser. No. 469,036
Claims priority, application United Kingdom, May 16, 1973, 23349/73
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² G02B *27/17*
U.S. Cl. 350—7 **17 Claims**

1. A method of scanning surface areas, said method comprising:

providing two substantially parallel beams of radiant energy of different cross-sectional area;

directing said two beams to strike individually a like number of different faces of a rotating mirror polygon, thereby deflecting the reflected paths of said beams through angles equal to twice the angular subtense of each polygon face at the polygon center; and

directing said two parallel beams of radiant energy after reflection from said faces of said mirror polygon onto at



least one surface, thereby scanning with both said beams at least one path across said at least one surface.

4,005,927

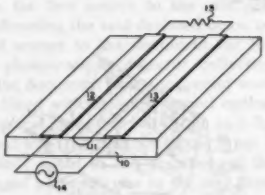
BROAD BANDWIDTH OPTICAL MODULATOR AND SWITCH

William M. Caton, El Cajon, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 10, 1975, Ser. No. 557,216

Int. Cl.² G02B 5/14

U.S. Cl. 350—96 WG **7 Claims**



1. An optical waveguide modulator and switch comprising:
an optical waveguide defining a path for the propagation of optical energy;
a source of microwave energy;
at least one strip transmission line disposed in co-directional proximity relative to said optical waveguide and connected to said source of microwave energy, said strip transmission line having dimensions and dielectric constants for producing a propagation velocity of the flow of said microwave energy substantially equal to the propagation velocity of said optical energy in said optical waveguide, causing a resultant traveling wave interaction therebetween; and
a microwave load means connected through electrical conductors to said strip transmission line for completing a closed electrical circuit with said source of microwave energy to absorb substantially all said microwave energy without any reflected wave energy.

4,005,928

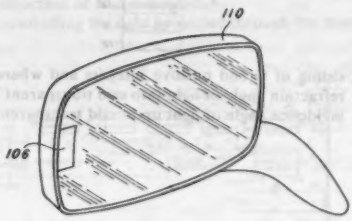
NEMATIC LIQUID CRYSTAL DISPLAYS FOR LOW VOLTAGE DIRECT CURRENT OPERATION

Allan Robert Kmetz, Richardson, and Linda Truitt Creagh, Argyle, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 148,763, June 1, 1971, abandoned. This application Aug. 1, 1973, Ser. No. 384,651

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **1 Claim**



1. An electro-optic display device comprising in combination:
a first optically transmissive substrate having an optically transmissive and electrically conductive region on one surface thereof,
a second substrate having an electrically conductive region on one surface thereof,
said first and second substrates spaced apart in a substantially parallel relationship such that said conductive regions face one another,
a body of a mesomorphic liquid crystal composition substantially filling the space between said first and second substrates, said mesomorphic liquid crystal composition comprising liquid crystalline material in an amount from 98.0 to 99.5% by weight and electrical conductivity modifiers dispersed in said liquid crystalline material in an amount from 0.5 to 2.0% by weight of said mesomorphic liquid crystal composition, said mesomorphic liquid crystal composition being effective to scatter incident light in response to an electric field applied thereacross, and said conductivity modifiers dispersed in said liquid crystalline material cooperating therewith to effect a current density in said mesomorphic liquid crystal composition in the range of from 0.5 to 3.0 $\mu a/cm^2$ at 15 volts d.c., and
an adsorbed layer of ion donor material formed on said conductive regions for enhancing electrical charge injection in sadi mesomorphic liquid crystal composition.

4,005,929

REFLECTIVE IMAGING MEMBER

James E. Adams, Ontario, and Werner E. L. Haas, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

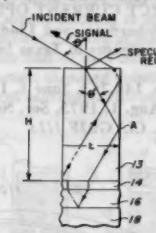
Filed Apr. 28, 1975, Ser. No. 572,373

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **15 Claims**

1. A reflection viewing system, comprising:
a. an imaging member comprising a layer of material capable of undergoing a change in light scattering or light absorption properties in imagewise configuration and, on one side of said layer of material, a planar reflecting layer;
b. illumination means for directing radiation upon said imaging member at an angle of incidence, θ and located on the other side of said layer of material; and
c. in contact with said imaging member on said other side of said layer of material, a reflection rejection layer comprising at least one transparent block in rectangular configuration and having the dimensions of height H, and

base L, characterized by the relationship $H = 3/2L \text{ Tan } \theta' + 2nL \text{ Tan } \theta'$, wherein n is selected from the group consisting of O and positive integers and wherein θ' is the refraction angle of light into said transparent block for an incidence angle of light upon said transparent block of θ.



4,005,930

ELASTIC HINGE FOR A PAIR OF SPECTACLES

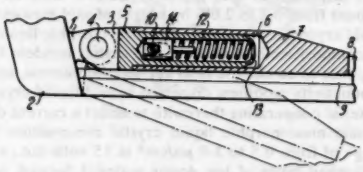
Andre Guenin, Petit-Lancy, Switzerland, assignor to La Nationale S.A., Geneva, Switzerland

Filed Jan. 13, 1975, Ser. No. 540,592

Claims priority, application Switzerland, Jan. 19, 1974, 534/74

Int. Cl.² G02C *5/16, 5/20, 5/22*

U.S. Cl. 351—113 **4 Claims**



1. In a resilient hinge for a pair of spectacles, comprising a first part rigidly fixed to a spectacle frame, a second part hinged to the first part and resiliently connected to an arm of the pair of spectacles, a casing fixed to said arm, said second part including an integral extension slidably mounted in said casing, a spring disposed in said casing and acting on said extension to bias said second part towards the free end of said arm, the improvement wherein said casing includes a longitudinal cylindrical housing, said extension comprising a tube of circular cross-section slidably mounted in said housing, a stop at the end of said tube, said tube having two longitudinal slots disposed along two diametrically opposed generatrices thereof, a transverse pin in said housing and engaged in said slots, said pin having a median portion and two end portions of greater diameter than said median portion, a yoke-shaped stud interposed between said spring and said pin, said yoke-shaped stud engaging said median portion of said pin between said pin end portions of greater diameter, said spring lodged within said tube and bearing on the one hand against said stud and on the other hand against said stop at the end of said tube, whereby said pin angularly fixes the position of said circular tube in said cylindrical housing to prevent said tube from rotating.

4,005,931

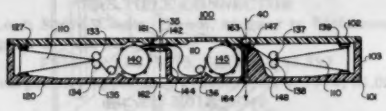
SEALED CASSETTE FOR OPTICAL SOUND PROJECTION

Seth Leroy Everett, Jr., Lincroft, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 15, 1974, Ser. No. 433,590

Int. Cl.² G03B *23/06*

U.S. Cl. 352--78 R **3 Claims**



1. A film cassette comprising an envelope completely sealed from harmful environmental conditions and containing therein a moveable light-permeable film and two rotatable hubs for receiving said film, said envelope including spaced major members having sealed therein transparent elements forming aligned windows to form an optically transparent film projection gate through which passes a film projection beam emanating from a source external to said envelope, intermittently driven means sealed within said envelope and engaging said film for providing intermittent movement of said film past said film projection gate when engaging corresponding intermittently controlled driving means external to said sealed envelope, said envelope further includes an optically transparent optical sound projection gate for permitting transmission therethrough of an optical sound projection beam emanating from a source external to said envelope, continuously driven means sealed within said envelope and engaging said film for providing continuous movement of said film past said optical sound projection gate when engaging corresponding continuously driven means external to said sealed envelope.

4,005,932

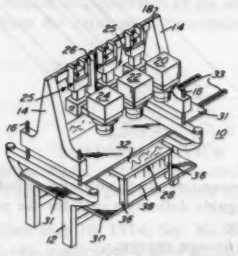
PHOTOGRAMMETRIC APPARATUS, METHODS OF USE, AND PRODUCTS PRODUCED THEREBY

Jackson Gates, P.O. Box 145, Kylertown, Pa. 16847

Filed Mar. 12, 1975, Ser. No. 557,612

Int. Cl.² G03B *21/00, 21/56;* **G01C** *11/12*

U.S. Cl. 353—6 **14 Claims**



1. Photogrammetric apparatus which provides a receiving surface upon which distortion free images may be created thus enabling the production of work products in which distortion has been eliminated comprising:

image projection means;

a flexible stretchable platen of a size sufficient to receive images projected thereon by said image projection means;

means of adjusting the level of a plurality of surface points of said flexible platen responsive to said images achieving a predetermined condition; and

means of retaining the achieved level of adjustment of a plurality of surface points of said flexible platen to pro-

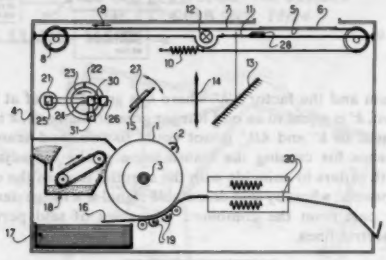
duce a stereo model onto which distortion free images are being projected.

4,005,933

COPYING AND TELECOPYING DEVICE

Martin de Loye, Paris, and Michel Béduchaud, Villebon-sur-Yvette, both of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Aug. 6, 1975, Ser. No. 602,523
Claims priority, application France, Aug. 9, 1974, 74.27732
Int. Cl.² G03B 27/70, 27/48
U.S. Cl. 355—66 **5 Claims**



1. Copying and telecopying device for the analysis and reproduction of a document comprising a first light source ensuring the scanning of the document for the analysis thereof during relative movement of the document and the said first source, photosensitive means for ensuring the reproduction of the document, first optical means for the deviation and projection of the light transmitted by the document, during the analysis thereof, on the photosensitive means, a second light source, a modulator controlled by a signal coming from the analysis of a document, second optical means for linear deviation for sending out, from the said second source, a first thin beam received by the said optical means for ensuring the line-by-line scanning of the document, or a second thin beam modulated for ensuring the reproduction of the document analyzed on the said photosensitive means, a third retractable optical element belonging to the said first optical means positioned for directing the light coming from the analysis of the document from the first source to the said photosensitive means and for directing the said deviated beam coming from the said second source to the document for the analyzing thereof and a photosensitive detector collecting the light transmitted by the document from the second source, a cylindrical lens combined with the said second optical means to constitute the optical input element of the said first deviated beam, said cylindrical lens having a plane input face with a length substantially equal to the deviation of the said first beam and arranged perpendicular to the said first beam.

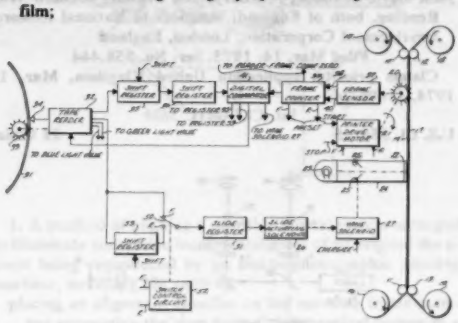
4,005,934

APPARATUS FOR EXECUTING LIGHT CONTROL OPERATIONS IN A BIDIRECTIONAL FILM PRINTER

Hans Chr Wohlrab, North Hollywood, Calif., assignor to PSC Technology Inc., Glendale, Calif.

Filed Mar. 14, 1975, Ser. No. 558,536
Int. Cl.² G03B 27/04
U.S. Cl. 355—88 **14 Claims**

1. A bidirectional film printer comprising:
means for selectively transporting a length of master film and a length of raw film past a point of exposure in either a forward or a reverse direction;
means for projecting light through the master film onto the raw film at the point of exposure;
means for counting the frames of the master film during transport;
tape storage means along which units of light control information and units of frame count information indicating the frame count of the master film where such light control information is to be used are stored in the sequence in which the units of light control information are to be used during film transport;
means for selectively transporting the tape storage means in a forward direction to retrieve the units of information in the order that they are to be used in the forward direction of film transport and for transporting the tape storage means in a reverse direction to retrieve the units of information in the order in which they are to be used in the reverse direction of film transport;
means for controlling the light projected through the master film;



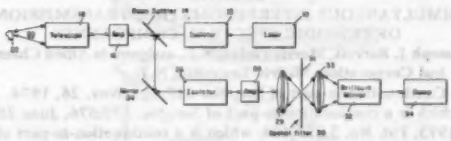
means for retrieving from the tape storage means one unit of light control information and one unit of frame count information in the same pairs in both directions of tape transport;
first means for transmitting the units of light control information to the light controlling means;
a comparator;
second means for transmitting the frame count indicated by the frame counting means to the comparator; and
third means for transmitting the units of frame count information to the comparator for comparison with the frame count indicated by the frame counting means, one of the transmitting means including means for delaying the units transmitted thereby in one direction of film transport one light control operation relative to the units transmitted thereby in the other direction of film transport.

4,005,935

METHOD AND APPARATUS FOR PROVIDING A PHASE COMPENSATED OPTICAL BEAM

Victor Wang, Oxnard Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed July 31, 1975, Ser. No. 601,123
Int. Cl.² G01C 3/08
U.S. Cl. 356—5 **14 Claims**



1. A system for applying energy to a remotely located target such that the energy beam is compensated for the effects of phase perturbations encountered along the path to the target, said system comprising:
first transmission means for transmitting a beam of electromagnetic energy to the target;
means for receiving energy which is returned from the target along a given path;
optical processing means for backscattering said received energy so as to produce therefrom energy which is the complex phase conjugate of the received energy; and

second transmission means for transmitting said complex phase conjugate energy along said given path to the target;

whereby said complex phase conjugate energy beam is compensated for the effects of phase perturbations encountered along said given path and is therefore substantially focused at the target.

4,005,936

INTERFEROMETRIC METHODS AND APPARATUS FOR MEASURING DISTANCE TO A SURFACE

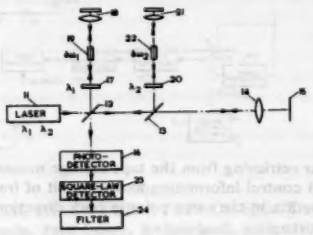
John David Redman, Newbury, and Michael Richard Wall, Reading, both of England, assignors to National Research Development Corporation, London, England

Filed Mar. 14, 1975, Ser. No. 558,444

Claims priority, application United Kingdom, Mar. 15, 1974, 11606/74

Int. Cl.² G01C *3/08*

U.S. Cl. 356—5 **22 Claims**



21. An interferometric method of measuring the distance to a surface comprising:

providing a first pair of coherent light outputs of frequencies ω_1 and $\omega_1 + \delta\omega_1$, and a second pair of coherent light outputs of frequencies ω_2 and $\omega_2 + \delta\omega_2$;

directing one of said first pair of outputs and one of said second pair of outputs on to said surface;

receiving on photosensitive detector means the one of each said pair of outputs which is directed to and reflected from said surface and the one of each pair of outputs which is not thus directed and reflected from said surface such that the part of frequency ω_1 interferes coherently with at least the part of frequency $\omega_1 + \delta\omega_1$ and the part of frequency ω_2 interferes coherently with at least the part of frequency $\omega_2 + \delta\omega_2$ at said detector means;

and deriving from said detector means a signal at a difference frequency $(\delta\omega_1 - \delta\omega_2)$ whereof the phase is a measure of said distance.

4,005,937

SIMULTANEOUS INTERFEROMETRIC TRANSMISSION OF PERIODIC SPECTRAL COMPONENTS

Joseph J. Barrett, Morris Plains, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 527,465, Nov. 26, 1974, which is a continuation-in-part of Ser. No. 373,576, June 25, 1973, Pat. No. 3,853,404, which is a continuation-in-part of Ser. No. 280,378, Aug. 12, 1972, abandoned. This application June 6, 1975, Ser. No. 584,434

The portion of the term of this patent subsequent to Dec. 10, 1991, has been disclaimed.

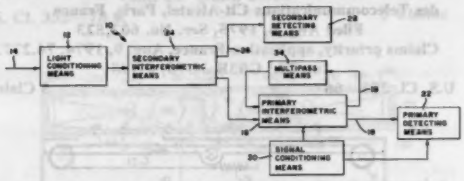
Int. Cl.² G01J *3/44*; **G01B** *9/02*

U.S. Cl. 356—106 S **28 Claims**

1. Apparatus for analyzing light having spectral components periodic in frequency comprising:

a. light conditioning means for collecting, collimating and transmitting said light; and

b. primary interferometric means adapted to receive said light and transmit said periodic spectral components in the form of a detectable signal, said primary interferometric means having interference-producing means for providing a plurality of transmission windows regularly spaced in frequency, the frequency spacing between adjacent windows being adjusted to equal substantially the product of half the frequency difference between adjacent spectral components of the same periodic spec-



trum and the factor k/k' where k is an integer of at least two, k' is equal to an odd integer greater than one, k is not equal to k' and k/k' is not equal to two, and scanning means for causing the transmission peaks for adjacent k'th orders to coincide with the spectral lines of the components, whereby said detectable signal is a fringe derived in part from the combined intensities of said periodic spectral lines.

4,005,938

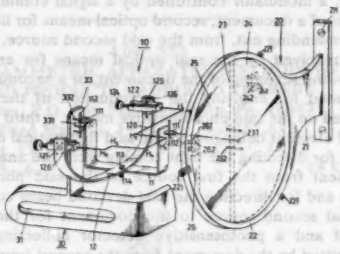
HORIZON INDICATING DEVICE FOR MARINE SEXTANT

Shiaw-Lei Ho, No. 32, Lane 40, Tai Sheng St., Taipei, China /Taiwan

Filed Sept. 5, 1975, Ser. No. 610,866

Int. Cl.² G01C *15/14*

U.S. Cl. 356—149 **5 Claims**



1. In a marine sextant having a main frame carrying a telescope and a horizon glass, the improvement comprising means between said telescope and horizon glass for simulating a real horizon to compensate for poor visibility and rough seas, said horizon simulating means comprising:

a first U-shaped bracket having upwardly extending arms,

a second U-shaped bracket having upwardly extending arms,

the bottom portions of said first and second brackets being secured together, with said brackets arranged at 90° relative to one another;

said first U-shaped bracket having one of its arms pivotably mounted to the center of the horizon glass, and the other of its arms pivotably mounted to a vertically upstanding support on the main frame of the sextant, to define a first axis of rotation;

a pair of bubble level assemblies pivotably mounted to the arms of said second U-shaped bracket to define a second axis of rotation;

each bubble level assembly including a counterbalancing screw at one end;

a luminous wire of zig-zag shape having its ends mounted on said bubble level assemblies;

said wire being oriented to simulate a real horizon on said horizon glass when viewed through said telescope;

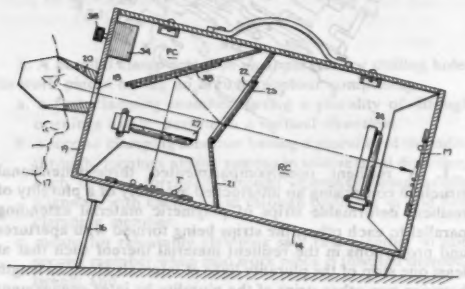
said wire being rotatable about said first and second axes of rotation to compensate for pitching and rolling movements of a ship.

4,005,939

OPTICAL COMPARATOR FOR TESTING PRINTED CIRCUIT BOARDS

Lawrence S. Stavalone, 7 Salmon Creek Drive, Hilton, N.Y. 14468

Filed Oct. 9, 1975, Ser. No. 621,249
Int. Cl.² G01B 9/08, 11/24
U.S. Cl. 356—165 **9 Claims**



1. An optical comparator for testing a printed circuit board or other complex assembly to determine whether it matches a master printed circuit board, said comparator comprising:

A. a casing divided by a partition into a normally-dark front chamber and a normally-dark rear chamber, the front wall of the casing having an observation port therein, the partition having an inclined see-through mirror therein in alignment with said port, said see-through mirror being effectively transparent when only the normally-dark rear chamber is illuminated and being effectively reflective when only the normally-dark front chamber is illuminated;

B. means alternately to illuminate said normally-dark front and rear chambers at a periodic rate whereby in a first state in which the rear chamber is illuminated while the front chamber is dark, one may from said port look in a direct optical path through said see-through mirror which is then transparent into said rear chamber to see said master board which is disposed therein;

C. means to support said master board in said rear chamber at a predetermined position therein where it is fully visible from said port in said first state;

D. a reflecting mirror disposed in said front chamber at an angle to said see-through mirror, said see-through mirror being so disposed with respect to said reflecting mirror to provide an optical path in which the line from the eye of the observer to the see-through mirror is normal to the line from the reflecting mirror to the test board, whereby in a second state in which the front chamber is illuminated while the rear chamber is dark, the see-through mirror is then reflective and cooperates with said reflecting mirror so that one may from said port look by way of an indirect optical path into said front chamber to see said test board which is disposed therein; and

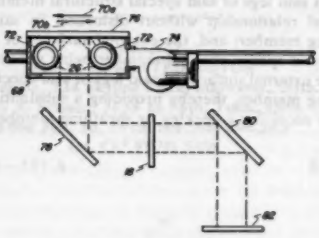
E. means to support said test board in said front chamber at a position therein where it can be seen from said port in said second state at a position which appears to be coincident with the predetermined position at which the master board is seen in said first state, whereby when the test board matches the master board, the visual impression is that of a continuously-illuminated image, but if a disparity exists therebetween, light pulses are produced at said periodic rate indicating a disparity therebetween.

4,005,940

OPTICAL SYSTEM ALIGNMENT APPARATUS

Wayne L. Kidd, and Stephen C. Corona, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 439,172, Feb. 4, 1974, Pat. No. 3,904,290.
This application Feb. 27, 1975, Ser. No. 553,774
Int. Cl.² G03G 15/00
U.S. Cl. 356—172 **4 Claims**



1. A method of aligning a movable optical system arranged to illuminate successive incremental areas of an original document being reproduced by an electrophotographic printing machine, including the steps of:

placing an alignment member on the movable frame member supporting the scan lamps of the optical system in a light receiving relationship with the light rays transmitted from the scan lamps;

transmitting the light rays reflected from the alignment member through the lens of the optical system forming a sample light image thereof;

directing the sample light image onto an indicator having a calibration mark thereon;

moving the carriage of the optical system from the start of travel position to the end of travel position; and

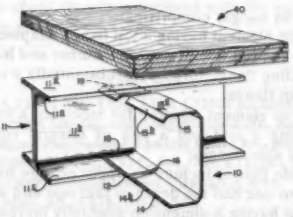
comparing the movement of the sample light image on the indicator relative to the calibration mark thereon to determine the alignment of the optical system.

4,005,941

STRUCTURAL CONNECTION

Joseph N. Laborde, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 173,029, Aug. 19, 1971, abandoned.
This application Dec. 2, 1974, Ser. No. 528,633
Int. Cl.² F16B 7/00
U.S. Cl. 403—247 **4 Claims**



1. A structural connection comprising, a special channel member and a special receiving structural member joined thereto; said special channel member having a pair of vertical legs extending substantially the length thereof and each joined to the base of the channel by an inclined corner wall, said channel member legs having bendable leg portions formed on one end thereof by opposing cuts extending through said channel member vertical legs and said inclined walls, said cuts

extending the height of said channel member vertical legs; said leg portions being bent toward each other; said special receiving structural member having a pair of legs extending substantially the length thereof, said structural member legs being spaced apart and having an opening therebetween, said opening being of a size sufficiently large for receiving said bent toward each other leg portions but sufficiently small for rejecting said channel member legs; said bendable leg portions of said special channel member being inserted in said opening between said legs of said special structural member in a tight frictional relationship without distortion in said structural receiving member; and, the external surfaces of said vertical legs of said special channel member being substantially flush with the external surfaces of said legs of said special structural receiving member, thereby providing a substantially flat surface for receiving a decking or sheathing member.

4,005,942

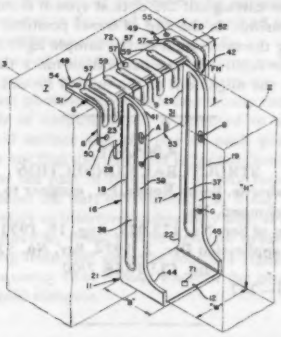
METAL HANGER

Tyrell Gilb, Berkeley, Calif., assignor to Simpson Manufacturing Co., Inc., San Leandro, Calif.

Filed Mar. 22, 1976, Ser. No. 668,821

Int. Cl.² F16B *5/00*

U.S. Cl. 403—189 **6 Claims**



1. A purlin hanger comprising:

a. an angle element having a top flange adapted for connection to the top side of a wood member and having a lower depending flange formed at substantially a right angle to said top flange;

b. a stirrup element adapted for receiving a wood member including a seat and a pair of integral right angularly related side flanges;

c. said side flanges include an upper portion having a width equal to one half the depth of said seat and a lower minor portion having a dimension gradually increasing in width until it is equal to the depth of said seat;

d. weld means attaching a portion of the back edge of said stirrup element to the front face of the lower depending flange of said angle element; and

e. an embossment in the side of each of said side flanges of said stirrup extending substantially the length of said upper portion increasing the effective thickness of said flanges for increasing the resistance of said flanges to torsion and bending forces.

4,005,943

RESILIENT STRUCTURES

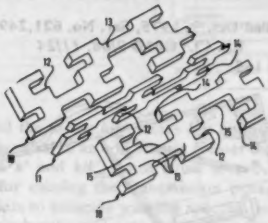
Graham Frampton Devenish, and Peter Christopher Dickson, both of Liverpool, England, assignors to Dunlop Limited, London, England

Filed Dec. 2, 1974, Ser. No. 528,626

Claims priority, application United Kingdom, Feb. 19, 1974, 7592/74

Int. Cl.² E01C *5/00*

U.S. Cl. 404—41 **11 Claims**



1. A resilient open-compartmented three-dimensional structure comprising an interlocked assembly of a plurality of resilient deformable strips of polymeric material extending parallel to each other, the strips being formed with apertures and projections in the resilient material thereof such that at least one strip of the plurality links at intervals along its length between two other strips of the plurality by inter-engagement of projections and apertures, each strip being inclined relative to the plane of the structure.

4,005,944

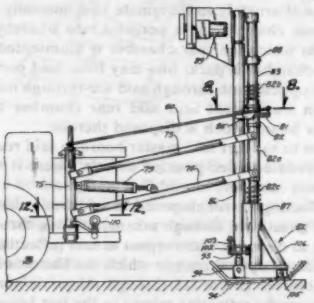
TAMPING APPARATUS

Marvin K. Harris, Sheldahl, Iowa 50243

Division of Ser. No. 369,891, June 14, 1973, Pat. No. 3,908,292. This application Aug. 6, 1975, Ser. No. 602,256

Int. Cl.² E01C *19/34*

U.S. Cl. 404—133 **8 Claims**



1. A device for tamping a trench comprising:

a supporting means;

a housing attached to said supporting means;

means for providing lost motion along a substantially vertical axis between the supporting means and the housing;

an elongated tamping shoe having an upturned portion on the forward end thereof, said tamping shoe being hingedly connected to said housing near the forward end thereof rearwardly of said upturned portion;

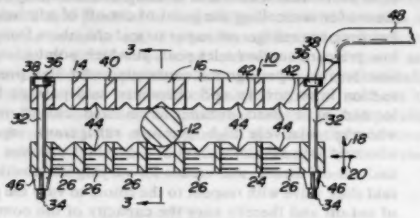
a drive shaft adapted for reciprocal movement within said housing, said drive shaft extending below said housing and being pivotally connected to a rearward portion of said tamping shoe; and

reciprocating drive means resiliently connected to said drive shaft for imparting reciprocal movement thereto.

4,005,945
DRILL GUIDE

David Gutman, 503 Reed St., Philadelphia, Pa. 19147

Filed Sept. 25, 1975, Ser. No. 616,895
Int. Cl.² B23B 47/28, 49/02; B25B 1/00
U.S. Cl. 408—115 B 9 Claims



1. A parallel clamp and drill jig apparatus for drilling holes in work pieces having an arcuate contour comprising:

a. a first clamping member having a plurality of through openings axially passing in a vertical direction;

b. a second clamping member having a plurality of threaded through openings axially passing in said vertical direction, each of said threaded through openings being axially alignable with each of said through openings in said first clamping member;

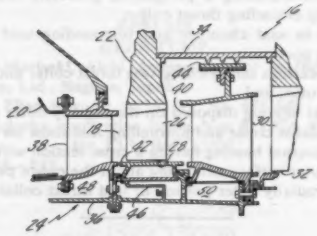
c. means for releasably clamping said first member to said second member when said work piece is inserted therebetween; and,

d. means for axially aligning said work piece between said first member through openings and said second member threaded through openings.

4,005,946
METHOD AND APPARATUS FOR CONTROLLING STATOR THERMAL GROWTH

Bertrand Hirsch Brown, Glastonbury; Francis Louis DeTolla, Vernon, and Dale Robert Reilly, Marlborough, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed June 20, 1975, Ser. No. 588,916
Int. Cl.² F01D 25/24
U.S. Cl. 415—136 4 Claims



1. In a gas turbine engine having a rotor and a stator having elements which radially surrounds the rotor, apparatus for controlling the radial clearance between the rotor and the stator, including:

a turbine case which is coolable and which supports said elements of the stator which radially oppose the rotor; and

an air valve operatively disposed with respect to said case to control the flow of cooling air adjacent thereto, said valve comprising

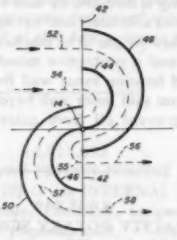
a deflecting ring which is directly affixed to said turbine case, and

a base ring supported by said elements which is spaced radially inward of said deflecting ring and is in interference contact with said base ring, wherein the base ring is fabricated from a material having a coefficient of thermal expansion which is less than the coefficient of thermal expansion of the material from which the deflecting ring is fabricated such that the base ring and deflecting ring are separable in operative response to the attainment of a predetermined threshold temperature allowing cooling air to flow between said rings.

4,005,947
FLUID OPERATED ROTOR

Joseph R. Norton, 724 Skyline Place, Stillwater, Okla. 74074, and Sidney E. Scisson, 2835 E. 58th, Tulsa, Okla. 74105

Filed Feb. 10, 1975, Ser. No. 548,243
Int. Cl.² F03D 3/06
U.S. Cl. 416—197 A 6 Claims



1. A moving-fluid-operated rotor for utilization of a portion of the kinetic energy of a moving fluid, comprising;

a. four rectangular structures of equal length;

b. the width of a first and second structure equal to each other, the width of the third and fourth structures equal to each other and wider than the width of the first and second structures;

c. all four structures curved about an axis parallel to the length of said structures, in the general shape of wings;

d. the planes of the first and second structures, or wings, as defined by their two edges, being coincident, with one edge of the first wing joined to the opposite edge of the second wing, the first wing being convex while the second wing is concave with respect to their mutual plane;

e. the third and fourth structures, or wings, positioned substantially coaxial with the first and second wings respectively;

f. end plates attached to and supporting said wings in their relative positions to form a rigid assembly; and

g. shaft and bearing means for supporting said assembly for rotation about an axis coincident with the joint between said first and second wings.

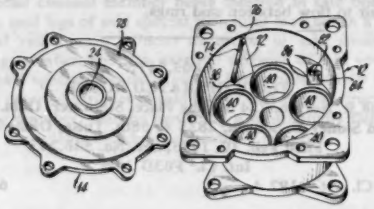
4,005,948
LUBRICATION SYSTEM FOR COMPRESSOR UNIT

Masaharu Hiraga, Isesaki, and Shigemi Shimizu, Sakai, both of Japan, assignors to Sankyo Electric Co., Ltd., Isesaki, Japan

Filed Sept. 8, 1975, Ser. No. 611,161
Claims priority, application Japan, Oct. 9, 1974, 49-117547; Mar. 15, 1975, 50-31562
Int. Cl.² F04B 1/12; F01M 1/00
U.S. Cl. 417—269 16 Claims

1. A compressor including a compressor housing having a discharge chamber which includes an inlet and an outlet, means for controlling the flow of fluid between the inlet and outlet of said discharge chamber a plurality of cylinders in said housing piston means including a shaft for imparting reciprocating motion of said piston means in said cylinders to compress a refrigerant fluid therein, a front housing on said com-

pressor housing including an opening for receiving said shaft, means being provided to effect fluid communication between said shaft seal cavity and the interior of said compressor housing, an oil deflector depending from the inner wall of said compressor housing, said front housing including an oil opening disposed adjacent said oil deflector and a passageway formed therein effecting communication between said oil opening and said shaft seal cavity, whereby oil on the inner



wall of said housing is directed by said deflector through said oil opening and into said shaft seal cavity, an oil bypass opening for allowing blow-by gas to be discharged from the interior of said housing, and a protective member circumferentially spaced along said housing inner wall from said oil deflector and projecting from said inner wall beyond said bypass opening, thereby to prevent oil from entering into said bypass opening.

4,005,949

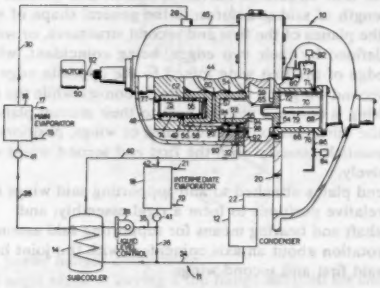
VARIABLE CAPACITY ROTARY SCREW COMPRESSOR

Whitney I. Grant, Muskego, Wis., assignor to Vilter Manufacturing Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 513,542, Oct. 10, 1974, abandoned, which is a division of Ser. No. 403,195, Oct. 3, 1973, Pat. No. 3,859,814. This application Sept. 29, 1975, Ser. No. 617,692

Int. Cl.² F01C *1/16, 21/12;* **F04C** *17/12, 29/08*

U.S. Cl. 418—15 **3 Claims**



1. A variable capacity multiple inlet rotary screw compressor comprising:

a housing having a low pressure suction inlet port for admission of refrigerant vapor at relatively low pressure, a high pressure suction inlet port for admission of refrigerant vapor at relatively high pressure, and a discharge port for discharge of compressed refrigerant vapor;

a pair of oppositely rotating constant mesh rotors defining chambers, said rotors being positioned within said housing to provide pumping and compressing action within said chambers, said chambers being connected at one end to the low pressure suction inlet port and at the other end to the discharge port; and

means for regulating the point of cut-off of admission of low pressure refrigerant vapor into the compression chambers and for introducing relatively high pressure refrigerant vapor into the compression chambers at a constant distance from the point of cut-off whereby the amount of compression of said low pressure refrigerant vapor between said point of cut-off and the compression chambers where high pressure vapor is introduced is constant;

said regulating means including a slide valve positioned for axial movement within said housing and including cut-off means for controlling the point of cut-off of admission of low pressure refrigerant vapor to said chambers from said low pressure suction inlet port, at which point compression begins, a passage for connecting said high pressure suction inlet port to said chambers, said passage being located at a fixed distance from said cut-off means whereby relatively high pressure refrigerant vapor is admitted into said chambers at a constant distance from said cut-off means, and means for varying the position of said slide valve with respect to the rotors to vary the point of cut-off and thereby vary the capacity of the compressor.

4,005,950

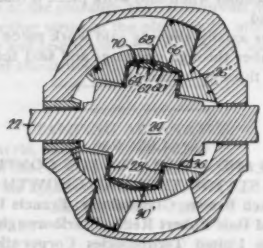
BEARINGS FOR SLANT AXIS ROTARY MECHANISMS

Alexander Goloff, East Peoria, and Roger O. Bjerk, Edelstein, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 5, 1975, Ser. No. 629,198

Int. Cl.² F01C *1/02, 17/00;* **F03C** *3/00;* **F04C** *17/02*

U.S. Cl. 418—53 **3 Claims**



1. A slant axis rotary mechanism comprising:

a housing defining a chamber including an operating cavity;

a shaft journalled in said housing and including an angularly offset portion within said chamber, said angularly offset portion including a peripheral, generally radially outwardly extending thrust collar;

a rotor in said chamber and surrounding said angularly offset portion;

thrust bearings sandwiching said thrust collar and engaging said rotor; and

a journal bearing disposed on the radially outer portion of said thrust collar and journalling said rotor on said shaft, said journal bearing having a cross section with a spherical outer surface extending about the entire periphery of said radially outer portion of said thrust collar.

4,005,951

ROTARY VANE ENGINE WITH ORBITING INNER AND OUTER MEMBERS

Dominicus Adrianus Johannes Swinkels, Trigg, Australia, assignor to The Broken Hill Proprietary Company Limited, Melbourne, Australia

Filed Feb. 27, 1974, Ser. No. 446,478

Claims priority, application Australia, Mar. 1, 1973, 2450/73

Int. Cl.² F01C *1/02;* **F03C** *3/00*

U.S. Cl. 418—61 R **6 Claims**

1. An engine comprising a housing including an internal peripheral wall and opposed end walls, a shaft rotatably supported in the housing, a piston member journalled eccentri-

cally on said shaft to describe an orbital path within said housing upon relative rotation between said shaft and said housing, said piston member defining with said internal peripheral wall and said end walls a working cavity, a plurality of vanes disposed generally radially to the axis of said shaft and supported in said housing for reciprocal movement radially with respect to the axis of said shaft, and for lateral movement between a first position in radial alignment with a radius of said piston member and a plurality of second positions on either side of said first position and wherein said vanes are parallel to said first position, said vanes being mechanically controlled between two sets of parallel control surfaces to prevent radial movement of said vanes relative to said parallel control surfaces while allowing lateral movement of said vanes along said control surfaces between said first position and said

second positions, one set of said parallel control surfaces being located on the periphery of said orbiting piston member, the other set of said parallel control surfaces being located on vane controlling member or members located outside said working cavity, said vane controlling member or members moving in an orbital path about said shaft axis as said piston orbits, sealing means operatively disposed between each said vane and said piston member, said housing peripheral wall and said housing end walls to divide said working cavity into a plurality of chambers, the volume of each said chamber varying as said piston member orbits, and means to regulate the admission to and exhausting from each said chamber in sequence of a working fluid to induce orbiting of said piston member and the resultant relative rotation between said shaft and said housing.

4,005,952

GEAR PUMP

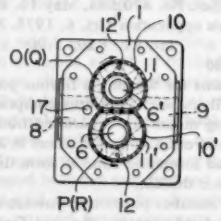
Nobukazu Morisaki, Aichi, Japan, assignor to Daido Metal Company, Ltd., Nagoya, Japan

Filed Mar. 18, 1975, Ser. No. 559,648

Claims priority, application Japan, Nov. 8, 1974, 49-128636

Int. Cl.² F04C *15/00*

U.S. Cl. 418—131 **3 Claims**



1. A gear pump comprising a pair of intermeshing gears, a driving shaft operatively connected to one of said gears and driven shaft operatively connected to the other of said gears and a seal arrangement for maintaining axial pressure fields of said gear pump, said seal arrangement including bearing bushes disposed at least on one side of said gears with said bearing bushes extending around one of said shafts in bearing relationship therewith, each of said bearing bushes having on one end a first annular groove surrounding a bore through which a respective one of said shafts extends and a second annular groove at the periphery thereof, a first annular or ring seal seated in said first annular groove to define a first pressure field encompassing a bearing bore through which one of said shafts extend, a second annular or ring seal seated in said second annular groove to define a second pressure field, said pump including a housing with an end wall cooperating with said seals said pressure fields, said bearing bushes each including a flattened portion on its periphery extending beside a coextensive similarly flattened portion on the periphery of an adjacent one of said bearing bushes, each of said second ring seals following the contour of said flattened portions of its respective bearing bushing whereby each of said flattened portions and the second ring seal seated thereon is in abutting relationship against the flattened portion of the bearing bushing coextensive therewith to define said second pressure field, wherein said second pressure field is of relatively high pressure compared to that of said first pressure field.

4,005,953

PISTON OF A ROTARY PISTON ENGINE OF TROCHOID TYPE, HAVING AN INTERNAL SEAL

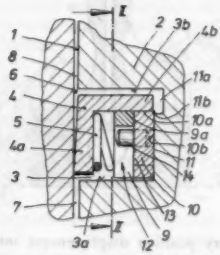
Max Ruf, Obereisecheim, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm, Wurtt, Germany

Filed Oct. 16, 1975, Ser. No. 622,962

Claims priority, application Germany, Oct. 18, 1974, 2449619

Int. Cl.² F04C *27/00*

U.S. Cl. 418—142 **3 Claims**



1. Piston of a rotary piston engine of trochoid type having a housing, comprising; an internal seal with a scraper ring of L-shaped cross section arranged axially movable in a concentric annular groove in one end wall of the piston and pressed with spring action against the adjacent end wall of the housing, the scraper ring being sealed off inside the annular groove by an elastic sealing ring arranged between the axial flange of the scraper ring and at least one wall of the groove, the elastic sealing ring consists of two closed metal rings immediately adjacent to each other and having their outer periphery in sealing and axially displaceable contact with the axial flange of the scraper ring, and inserted with a radial play between their inner periphery and the radially inner wall of the annular groove smaller than the radial play between the axial flange and the radially outer wall of the groove, a spring ring arranged between the radial flange of the scraper ring and the metal rings, pressing the scraping edge of the scraper ring axially against the end wall of the housing and the metal rings axially against each other and sealingly against the bottom of the annular groove.

4,005,954

PRODUCTION OF PLASTER FLOORS BY THE FLOODING PROCESS

Friedrich Hinsche, Leverkusen-Kueppersteg, and Kurt Schaupp, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 10, 1974, Ser. No. 459,821

Claims priority, application Germany, Apr. 16, 1973, 2319069

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² E04B *5/00*

U.S. Cl. 428—537 **7 Claims**

1. In the process for producing a plaster flooring having a flat and smooth surface by mixing an inorganic binder with water to form a fluid paste and applying said fluid paste to a surface to be covered so that said paste flows freely thereover, the improvements which comprise coating the surface to be covered with a water-absorbent layer prior to application of said fluid paste, said water-absorbent layer comprising at least one material selected from the group consisting of gypsum, natural anhydrite, synthetic anhydrite and cement and being used in 2.5 to 42% by weight of the solids in the fluid paste, said binder being an anhydrite which has a water-binder factor of about 0.38 to 0.75.

4,005,955

ROTARY INTERNAL COMBUSTION ENGINE WITH LIQUID COOLED PISTON

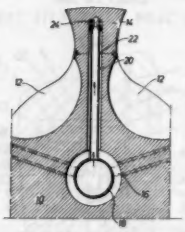
Roland Pamlin, Handen, Sweden, assignor to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Filed Oct. 28, 1975, Ser. No. 625,909

Claims priority, application United Kingdom, Oct. 29, 1974, 46838/74

Int. Cl.² F01C *21/06*

U.S. Cl. 418—94 **8 Claims**



1. In a rotary positive displacement internal combustion engine of the type comprising:

two intermeshing rotors, each provided with a central hub portion and a number of axially and radially extending spoke-like lobes with intervening grooves;

at least one of the rotors within its hub portion being provided with a central channel system comprising an axially extending supply channel and an axially extending discharge channel, and within each lobe at least one radially extending supply channel communicating with said axial supply channel and at least one radial return passage communicating with said radial supply channel and said axial discharge channel for passage of a cooling liquid therethrough to cool the respective rotor;

the improvement wherein:

said radially extending supply channel and return passage of each lobe comprise a substantially radial bore in said lobe and a supply pipe, said pipe being radially inserted in the bore and in communication with said axial supply channel, the interior of said supply pipe comprising the radially extending supply channel, said radially extending return passage being a space surrounding at least a portion of said supply pipe and being in communication with the interior of said supply pipe and with said axial discharge channel.

4,005,956

POWDER ACTIVATION AND INTEGRATED POWDER METALLURGY SYSTEM

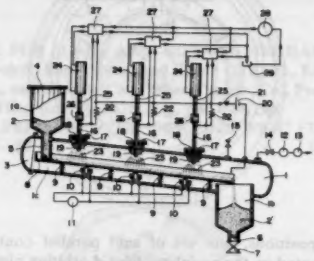
Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japan Research Inc., Yokohama, Japan

Continuation-in-part of Ser. No. 350,162, April 11, 1973, Pat. No. 3,932,760, which is a division of Ser. No. 60,070, July 31, 1970, Pat. No. 3,738,828, which is a continuation-in-part of Ser. No. 692,960, Dec. 22, 1967, Pat. No. 3,598,566. This application Oct. 21, 1975, Ser. No. 624,431

Claims priority, application Japan, Oct. 22, 1974, 49-121710; Nov. 30, 1974, 49-137857; Dec. 2, 1974, 49-139229

Int. Cl.² B30B *11/02*

U.S. Cl. 425—78 **22 Claims**



4. An activated sintering apparatus comprising: an evacuable gas-tight chamber for receiving a rarefied gas non-oxidizing atmosphere therein, conveyer means for receiving a supply of metallic powder thereon and passing the same in a fluidized state through and beyond a treatment zone, at least a pair of electrodes in said chamber for producing a glow discharge at said treatment zone so as to subject said powder to bombardment with energistic ions in said discharge thereby cleaning and activating said powder, means for maintaining the distance between said pair of electrodes at a value such that the product of the pressure of said atmosphere and said value, in mm Hg times cm, is in a range between 10^{-2} and 10, support means downstream of said treatment zone for receiving the activated powder in the form of a mass from said conveyer means, associated with said support means for compacting said activated means powder and means for heating the compacted mass to sinter it into a coherent body.

4,005,957

APPARATUS FOR FORMING FIBROUS PADS

Peter P. Savich, Longmeadow, Mass., assignor to Scott Paper Company, Philadelphia, Pa.

Division of Ser. No. 470,548, May 16, 1974, Pat. No. 3,939,240. This application Oct. 6, 1975, Ser. No. 619,575

Int. Cl.² B29J *5/00*

U.S. Cl. 425—80 **7 Claims**

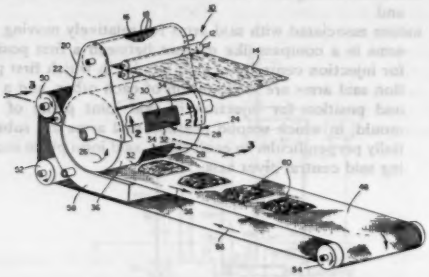
1. An apparatus for forming a fibrous pad from a gaseous suspension of fibers, said apparatus comprising:

A. a fiberizing means for separating fibers from a fibrous feed mat and entraining said fibers in a gaseous medium within a pad formation zone to form the gaseous suspension of fibers therein;

B. a forming member positioned downstream of the fiberizing roll and intercepting the pad formation zone, said forming member including a cavity having a foraminous forming surface and an upper margin defining an opening into said cavity, the area of the foraminous forming surface of said cavity being greater than the area of the opening defined by the upper margins of said cavity;

C. means for moving said forming member to move the cavity past the pad-formation zone;

D. a gas-directing vacuum means disposed beneath the foraminous forming surface of said cavity as it passes the pad-formation zone for establishing a pressure drop across said forming surface to direct the gas of the suspension through the forming surface, and to condense the fibers of the suspension onto said forming surface in the form of a fibrous layer;



E. a transfer conveyer positioned adjacent the forming member, a portion of said transfer conveyer being in close proximity to the forming member downstream of the pad-formation zone for overlying the cavity opening after the fibrous layer has been formed therein; and

F. means for transferring allegiance of the fibrous layer in the cavity to the transfer conveyer in the form of a fibrous pad having a greater basis weight than the basis weight of the fibrous layer formed in the cavity.

4,005,958

APPARATUS FOR CONTINUOUS PRODUCTION OF RECTANGULAR CROSS-SECTIONED FOAMED PLASTIC BUNSTOCK

Lawrence C. Porter, Palos Verdes Penninsula, Calif., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 381,923, July 23, 1973, Pat. No. 3,887,670. This application Mar. 21, 1975, Ser. No. 560,713

Int. Cl.² B29D *27/04*

U.S. Cl. 425—89 **14 Claims**

1. Apparatus for producing longitudinally continuous foamed bun stock from a reactive liquid polymer mix to produce a bun of substantially rectangular cross-section, uniform density and cell isotropicity, which comprises

conveyor means comprising a frame, a continuously advancing lower supporting portion and separate vertically disposed continuously advancing side portions associated with said lower portion, both said lower and side portions being supported on said frame to define an open-topped mold of generally U-shaped cross-section, and means driving said lower and side portions synchronously but independently along a path of travel defined by said frame;

means including said frame for supporting said lower conveyor portion to define a path of travel from a first to a second point on the path and disposing said conveyor portion at a slight declination in the direction of conveyor travel sufficient only to prevent float back of the developing foam thereon, including means on said frame for adjusting said supporting means to vary the declination of the path of travel between said first and second points;

means adjacent said conveyor for depositing said liquid polymer mix on said lower conveyor portion at said first point;

weir-forming means extending across said lower conveyor portion between said first and second points to elevate the surface of said lower conveyor portion as it is advanced thereover, said weir-forming means having provision for adjusting it longitudinally of the direction of conveyor travel and being of such low height only as to provide a shallow pool of liquid polymer mix across said conveyor upstream of said second point and avoiding build-up to a level which would produce any substantial hydrostatic head in the foam;

other means supporting said lower conveyor portion on said frame between said second point and a third point in its path of travel, including means operatively associated with said last named supporting means for adjusting said last-named supporting means to define a path of travel from said second to said third point which causes the surface of said lower conveyor portion to be shifted downwardly relative to said side conveyor portions along a line approximating the mirror image of the characteristic rise profile of the polymer mix during its interval of travel between said second and third

additional means on said frame supporting said lower conveyor portion between said third point and a point of discharge of the finished bunstock.

4,005,959

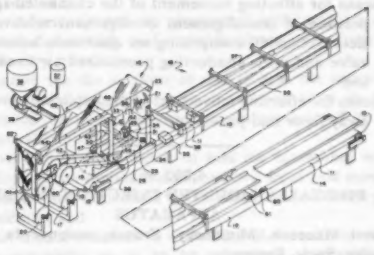
APPARATUS FOR PRODUCING SHAPED GLASS FIBER REINFORCED GYPSUM ARTICLES

Glenn E. Kautz, Sewickley, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 484,304, June 28, 1974, abandoned. This application Feb. 27, 1976, Ser. No. 661,867

Int. Cl.² B29C *3/00, 17/00*

U.S. Cl. 425—112 **4 Claims**



1. Apparatus for forming glass-fiber reinforced gypsum products comprising:

a. an assembly table;

b. means for delivering a first continuous, water-impervious membrane to the top of the said assembly table;

c. means for delivering as a ribbon a mixture of aqueous calcium sulfate hemihydrate and glass fibers to the top of the said first membrane, said mixture having a weight ratio of water to hemihydrate of 0.22 to 0.45;

d. means for delivering a second continuous water-impervious membrane above the said first membrane and above the said ribbon;

e. means for sealing together continuously the side edges of the said first membrane and the said second membrane to produce a continuous sandwich having a continuous water-impervious periphery about the said ribbon;

f. means for shaping the said sandwich into a desired profile;

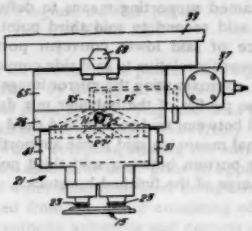
g. means for retaining the said sandwich in the desired profile until the said ribbon has set; and

h. means for cutting the said sandwich transversely across its width into sections of desired length.

4,005,960
APPARATUS FOR APPLYING PLASTIC TO A PLANAR SURFACE

Frank John Herdzina, Jr., Schaumburg, Ill., assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 401,143, Sept. 27, 1973. This application Oct. 14, 1975, Ser. No. 622,225
Int. Cl.² B29C *13/02*
U.S. Cl. 425—113 8 Claims



1. An applicator for applying plastic to a planar surface comprising:

a housing comprising a pair of nozzle assemblies, each containing an annular orifice and a channel through which plastic is conveyed to the orifice;

means for supplying plastic to the assemblies comprising a pair of connecting channels;

a valve sleeve positioned between the plastic supply and nozzles comprising a plurality of paired connecting channels in axial alignment with the nozzle and plastic supply channels and having fixed end members, said sleeve housing a spool having paired connecting channels in axial alignment with the valve sleeve channels, said spool being movable to a position of non-alignment relative to the aligned channels of the sleeve;

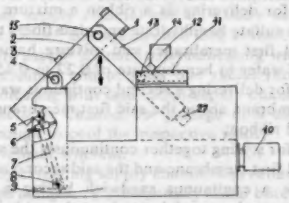
means for effecting movement of the channeled spool to a position of non-alignment or alignment relative to said sleeve channels comprising an electronic solenoid pilot valve and ports conducting pressurized air to said spool; and

means for effecting movement of the applicator toward and away from said planar surface.

4,005,961
PIVOTALLY MOUNTED INJECTION MOLDING APPARATUS

Marcel Manceau, Montlhery, France, assignor to Creusot-Loire, Paris, France

Filed Aug. 26, 1975, Ser. No. 608,008
Claims priority, application France, Aug. 26, 1974, 74.29160
Int. Cl.² B29F *1/00*
U.S. Cl. 425—190 5 Claims



1. An injection moulding machine comprising:

a frame;

a closure unit including a mould comprising two mould parts interengaging in a joint plane;

an injection unit; and

means associated with and supplying material for injection to said injection unit;

means operatively associated with said arms for controlling mould closure and injection;

a pair of arms articulated about a central pivot and each supported on said frame at a bearing point, means associated with said frame for varying the spacing of said bearing points;

means mounting said injection unit on one of said arms;

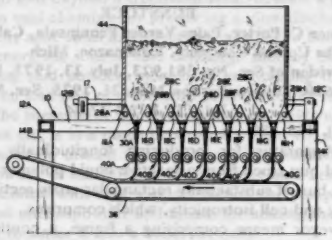
means mounting said closure unit on the other of said arms; and

means associated with said arms for relatively moving said arms in a compass-like manner between a first position for injection centrally of said mould, in which first position said arms are in extension of each other, and a second position for injection in said joint plane of said mould, in which second position said arms are substantially perpendicular to each other, said joint plane including said central pivot axis.

4,005,962
EXTRUDER FOR PLASTIC MATERIALS

Frank R. Kobee, 1839 Macomber St., Toledo, Ohio 43606

Filed Dec. 4, 1974, Ser. No. 529,271
Int. Cl.² B29F *3/08*
U.S. Cl. 425—197 3 Claims



1. A plastic extrusion machine for heating and extruding plastic material comprising in combination:

a. a base support member having an upper support surface;

b. a plurality of heating bar members disposed on the upper support surface of the base support member, said heating bar members being movable relative to one another over the upper surface of the upper support member;

c. heating means disposed in the internal areas of the heating bar members, said heating means serving to furnish the heat to radiate from the bar members and heat the plastic material placed on top of the heating bar members;

d. means located beneath the base support member to receive the heated plastic;

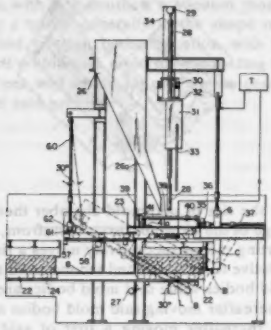
e. means affixed to said base support member for locking said movable heating bar members into position;

f. perforated plate means located immediately between the receiving means and the base support means, said perforated plate means having a plurality of holes disposed uniformly over the entire surface of said perforated plate means for purposes of receiving the amorphous plastic material and rendering said plastic material into strands.

4,005,963
PRODUCTION LINE FOR FORMING CONCRETE ELEMENTS

Mircea Borcoman, 7 rue de l'Etoile, Paris, France

Filed Oct. 18, 1974, Ser. No. 516,127
Claims priority, application France, Oct. 23, 1973, 73.37715
Int. Cl.² B28B 1/08, 7/10
U.S. Cl. 425—218 15 Claims



1. Apparatus for the production of concrete elements comprising in combination:

a tiltable frame adapted to tilt around a horizontal axis;

at least one mold comprising a shell and a cover adapted to be coupled and uncoupled, the mold obtained by coupling a cover and a shell being open at one end;

means operatively associated with said shell and cover of each mold for coupling and uncoupling the shell and cover thereof;

means securing at least one shell on said tiltable frame such that said mold is moveable with said frame between a vertical casting position for a concrete casting operation, and a horizontal unmolding position for uncoupling said shell from said cover;

means operatively associated with said mold for casting concrete into the vertically oriented mold with its open end located at its upper part, the casting of the concrete being done through said open end and resulting in providing a cast concrete element in said mold;

means operatively connected to the frame for tilting the frame to place the mold in said horizontal position with said cover being at the lower part of the mold;

means operatively connected to said coupling and uncoupling means for actuating the coupling means to separate the cover from the shell by a relative downward movement of said cover while the mold is in said horizontal position, the cast concrete element remaining in position on said cover;

a hardening zone operatively associated with said mold for hardening the concrete element;

means operatively connected to said cover for advancing said cover supporting said concrete element to said hardening zone;

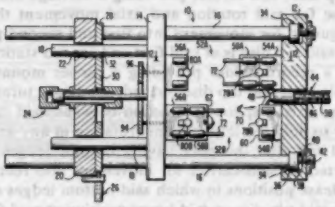
means operatively associated with said cover for separating a hardened concrete element from said cover; and

means operatively associated with said cover for reintroduction of a cover separated from said hardened concrete element into said frame to permit coupling of said cover with a shell secured to said frame for a subsequent concrete casting operation.

4,005,964
INJECTION-MOLD CLAMPING UNIT HAVING ALTERNATELY EJECTING DIE ASSEMBLIES

Thomas G. Bishop, Mount Gilead, Ohio, assignor to Koehring Company, Milwaukee, Wis.

Division of Ser. No. 372,955, June 25, 1973, Pat. No. 3,898,030. This application Feb. 10, 1975, Ser. No. 548,768
Int. Cl.² B29F 1/022
U.S. Cl. 425—242 R 17 Claims



1. In molding apparatus of the type in which material is injected into die cavity means and allowed to remain in said die cavity means for an interval, and then the molded material is removed from the die cavity means, the improvement comprising:

a stationary platen;

a movable platen movable toward and away from said stationary platen,

a plurality of die assemblies each including a floating die section and an associated stationary die section, the proximate faces of which being configured so as to define therebetween a mold cavity;

said stationary die sections being mounted on said stationary platen;

connecting means releasably connecting said floating die sections to said movable platen, and releasably connecting said floating die sections to said associated stationary die sections;

power means operatively associated with said movable platens for moving said movable platen away from said stationary platen to:

separate the die sections of one of said die assemblies whose floating die section is released from its associated stationary die section and connected to said movable platen, and

move away from another of said die assemblies whose floating die section is disconnected from said movable platen and connected to its associated stationary die section, and

injector means common to a plurality of die cavities of said die assemblies so as to be selectively communicable therewith for selectively injecting material therein;

said injector means including a stationary barrel having an outlet, and conduits communicating said outlet with said stationary die sections of said plurality of die cavities.

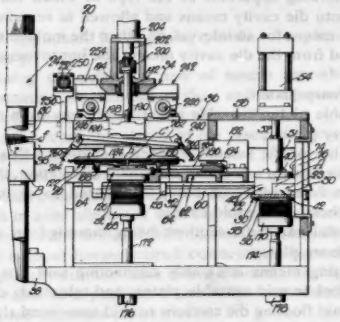
4,005,965
RECORD PRODUCING APPARATUS

Joseph P. Roczynski, Branford, and Chester P. Roczynski, Guilford, both of Conn., assignors to Valley Metallurgical Processing Co., Inc., New York, N.Y.

Filed May 27, 1975, Ser. No. 580,817
Int. Cl.² B29D 17/00; B29C 3/00
U.S. Cl. 425—315 4 Claims

1. In record producing apparatus, the combination of a turntable at a first station having a vertical axis and a center pin and being adapted to receive a pressed record with peripheral flash and a center hole located on said center pin; a top disc at said first station having a bottom face and being rotary about a vertical axis in line with said turnable axis and movable axially into upper and lower positions in which its bottom

face is retracted from and pressed against a record on said turntable, respectively, with said turntable and top disc constituting companion drive elements of which one is power-driven for the friction drive of a record pressed between said elements; means at said first station operative to trim the flash from a record on its friction drive to leave the trimmed record with a uniform peripheral margin outside the turntable periphery; a stacker at a second station; and means to transfer a trimmed record from said turntable to said stacker, including said top disc, and further providing a carriage mounting said top disc for said rotation and axial movement thereof, and being guided for movement into first and second positions in which said top disc is at said first and second stations, respectively, a record holder providing a carrier mounted on and movable with said top disc but independently turntable about said disc axis, a spline connection between said carriage and carrier to hold the latter against rotation in any axial position of said top disc, hangers having bottom ledges and being supported on said carrier for movement into record support and release positions in which said bottom ledges are, in relation to said top disc in said lower position at said first station,



outside the outer periphery of said turntable and spaced below, but in vertical alignment with, peripheral portions of said peripheral margin of a trimmed record on the turntable, and outside the peripheral flash of a pressed record on the turntable, respectively, with said spacing of said bottom ledges of the hangers below said peripheral margin of a trimmed record on the turntable being such that the ensuing gap between the resting record on the bottom ledges and the bottom face of the top disc on its rise into said upper position is sufficient to interrupt any attraction between top disc and record due to static electricity generated in the top disc on the friction drive of the record, and means operative to shift said hangers simultaneously into said support and release positions, respectively, whereby on the rise of the top disc at said first station from said lower position the bottom ledges on the hangers in their record support positions lift a trimmed record from the turntable and support it on continued rise of the top disc to said upper position and during movement of said carriage from said first position into said second position in which the supported record is above and in receiving alignment with said stacker for its drop thereon on shifting said hangers to said release positions.

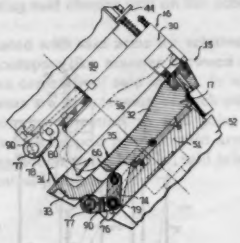
4,005,966

BLOW MOLDING MACHINE

Robert G. Nutting, Glenview, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed May 16, 1975, Ser. No. 578,020
Int. Cl.² B29C *17/07*
U.S. Cl. 425—326 B **15 Claims**

1. Apparatus for blow molding articles comprising a plurality of molds, means for moving said molds along a continuous path of travel, each mold being defined by a pair of mold bodies which define a mold chamber of a predetermined configuration, means for relatively moving each pair of mold bodies between open and closed positions thereof, means for extruding a tubular parison between each pair of mold bodies while in the open position thereof, means for expanding each tubular parison to the configuration of its associated chamber when the mold bodies are in their closed position, each mold being defined by first and second mold sections, means coupling each first and second mold section for movement relative to each other, means for imparting movement to one of said first and second mold sections of each pair of mold bodies



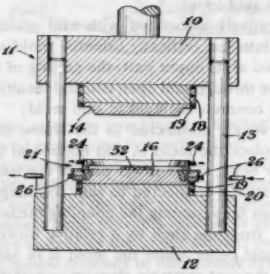
to increase the size of said mold chamber thereby facilitating the discharge of the blown parisons therefrom, and said movement imparting means successively moves a first of said mold sections relative to its associated second mold section of a first of said mold bodies while said mold bodies are in their closed position, thereafter moving said mold bodies away from each other, and thereafter moving a first of said mold sections relative to its associated second mold section of a second of said mold bodies.

4,005,967

SCRAPLESS FORMING OF PLASTIC ARTICLES

Ralph E. Ayres; Kenneth J. Cleereman, both of Midland, and Walter J. Schrenk, Bay City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 433,320, Jan. 14, 1974, Pat. No. 3,947,204, which is a continuation-in-part of Ser. No. 295,092, Oct. 2, 1972, abandoned, which is a division of Ser. No. 62,969, Aug. 11, 1970, Pat. No. 3,739,052. This application Jan. 21, 1976, Ser. No. 650,833
Int. Cl.² B29C *3/00, 17/04*
U.S. Cl. 425—326 R **4 Claims**



1. An apparatus for scrapless forming of thermoplastic articles comprising a ring-like forming fixture adapted to receive a measured amount of thermoplastic material to be forged into a preform which can subsequently be thermoformed into an article, said forming fixture comprising an upper ring with a central opening the lower extent of which defines a peripheral dimension about the same as that of said preform less its rim area, a lower ring including a central opening the upper extent of which defines a peripheral dimension about the same as that of said preform less its rim area, a lip opening contoured out of at least one of said rings around the entire extent thereof and presenting a face angled from the horizontal sufficient to resist the retraction stress of the thermoplastic material of the preform, the inner surfaces of said rings adjacent their respective central openings being spaced

from one another a distance no greater than the thickness of said preform and presenting opposed shoulders which together with said face secure the peripheral rim area of said preform, including its lip, in clamped fashion within said fixture prior to and during subsequent thermoforming of the preform into a container, cooling channels extending through at least one of said rings adjacent the rim receiving portion thereof sufficient to cool rapidly the rim area while leaving the central portion of said preform at a thermoformable temperature, the peripheral edges of said central openings being chamfered outwardly from their inner extent to their outer extent, the inner extent of said central openings being in open communication with one another, a vacuum thermoforming mold including a cavity generally in the shape of a desired container located in open communication with the central openings, means within said mold for evacuating fluid under vacuum therefrom, and means for cooling the container thermoformed from said preform.

4,005,968

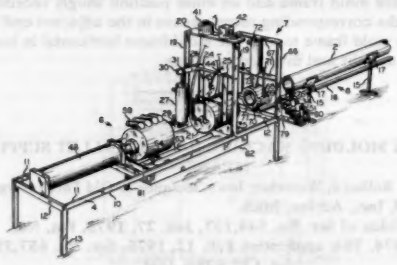
PIPE END REFORMING APPARATUS

William V. Crawford, Williamstown, Ky., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 19, 1975, Ser. No. 578,962

Int. Cl.² B29C *3/00, 17/00*

U.S. Cl. 425—384 **7 Claims**



1. A pipe end reforming apparatus comprising:

a. a support;

b. a mandrel;

c. first means movably mounting said mandrel on said support with said mandrel being movable in a generally linear path between a retracted position and a forming position for engagement with an end portion of a pipe;

d. clamp means mounted on said support and adapted for selectively holding a pipe in a preselected position;

e. heating means; and

f. second means movably mounting said heating means on said support with said heating means being movable, independently of said mandrel, in an arcuate path between a first position and a second position, when in said second position said heating means being in heat transfer relation to an end portion of a pipe and being in axial alignment with said clamp means and said mandrel and when in said first position said heating means being out of axial alignment with said mandrel and the pipe thereby providing clearance for said mandrel to move to the forming position whereby heating and forming can be accomplished without moving said pipe.

4,005,969

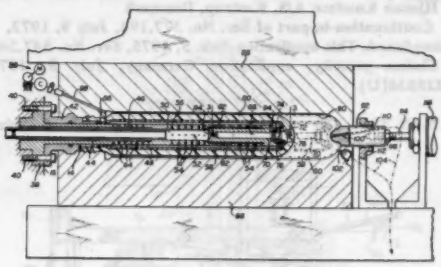
APPARATUS FOR LONGITUDINAL STRETCH FOR BLOW MOLDING

John J. Farrell, Green Brook, N.J., assignor to Farrell Patent Company, Greenbrook, N.J.

Division of Ser. No. 441,811, Feb. 12, 1974, Pat. No. 3,905,738. This application Jan. 31, 1975, Ser. No. 545,923

Int. Cl.² B29C *17/07*

U.S. Cl. 425—389 **9 Claims**



1. Blow molding apparatus comprising in combination, a core rod, an elastic balloon attached to the core rod at the neck end thereof, the balloon hugging the core rod when the balloon is in a deflated condition preparatory to having a parison applied over the outside surface of the balloon, and an end portion of the core rod remote from the neck end of the rod and that moves axially to extend the length of the core rod, means on said core rod to provide fluid passage between the core rod and balloon during core rod extension so that the balloon and the parison thereon are stretched lengthwise with the parison diameter and balloon diameter being substantially unchanged.

4,005,970

APPARATUS FOR CONTINUOUSLY PRODUCING SEALS IN TUBE-SHAPED PLASTICS FILM MATERIAL

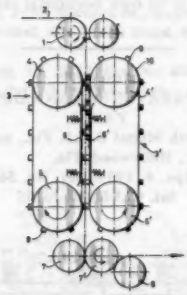
Arnoldus Willem Jan Leloux, Dedemsvaart, Netherlands, assignor to Wavin B.V., Zwolle, Netherlands

Filed Feb. 3, 1976, Ser. No. 654,840

Claims priority, application Netherlands, Feb. 3, 1975, 7501266

Int. Cl.² B29C *21/00*

U.S. Cl. 425—392 **16 Claims**



1. Apparatus for continuously producing seals in tube-shaped plastics film material, comprising means for supplying the web of material, at least one heating beam travelling along with the web and subsequently returning, means for keeping the web mechanically tension-free at the location where it is warm, means for keeping the heated film layers one against the other up to a pressing station, said pressing station comprising two rollers at least one of which is provided with cool-

ing means, and finally, means for discharging the web, a plurality of heating beams being provided which are interconnected by flexible and longitudinally adjustable means such as belts so as to form an endless loop which is guided over and driven by appropriate adjustable tensioning rollers.

4,005,971

CASTING MACHINE FOR MAKING CONCRETE SLABS

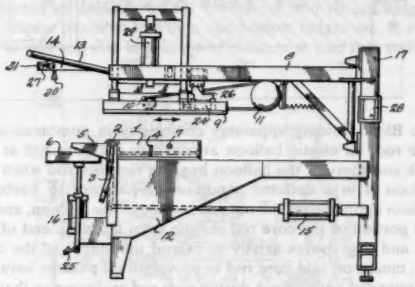
Niels Hjarno Knudsen, Dragor, Denmark, assignor to N. Hjarno Knudsen A/S, Kastrup, Denmark

Continuation-in-part of Ser. No. 377,194, July 9, 1973, abandoned. This application Feb. 5, 1975, Ser. No. 547,246

Claims priority, application Germany, July 8, 1972, 7225536[U]

Int. Cl.² B28B *3/02*

U.S. Cl. 425—410 **6 Claims**



1. In a casting machine for making concrete slabs and having a concrete receiving interchangeable mold comprising side walls and a bottom, and being mounted in support so as to be swingable 180° about a horizontal axis from a concrete filling position into a mold stripping position, and a vibrator displaceably mounted above the mold, the improvement comprising means for mounting the vibrator swingable about a vertical axis from a position at the side of the mold to a working position over the mold in its filling position, and a vertically movable pressure and vibrator plate mounted on said vibrator so that it can be brought to press against and vibrate the surface concrete filled into and up over the top edge of the mold walls in a sidewardly reciprocating movement, means for activating and deactivating the vibrator and means for reciprocating said plate relative to said arm to perform short glazing reciprocations in its own horizontal plane without vibrations.

4,005,972

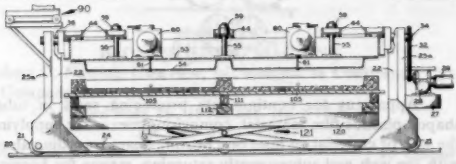
INVERTIBLE APPARATUS FOR MOLDING A CONCRETE PANEL

Alex Sommers, North Miami Beach, Fla., assignor to Bearingwall Systems Inc., Hollywood, Fla.

Filed Apr. 4, 1975, Ser. No. 565,101

Int. Cl.² B28B *13/05*

U.S. Cl. 425—439 **3 Claims**



1. In an apparatus for molding a thin concrete panel of broad surface area, said apparatus having

a rigid, unitary mold frame which provides the peripheral sides of a mold cavity;

a support framework for the mold frame having upstanding supports outside the mold frame at opposite ends of the latter;

a pair of aligned, horizontal pivot shafts pivotally connecting said opposite ends of the mold frame to said upstanding supports for pivotal adjustment of said mold frame through 180° between an upright horizontal position and an inverted horizontal position;

a separate bottom plate slidably vertically inside said mold frame and located at the bottom of the mold frame when the latter is in its upright position;

a mold core resting on top of said bottom plate inside the mold frame when the mold frame is in said upright position;

clamp means operatively engaging the mold frame to releasably clamp a pallet on top of the mold frame to extend horizontally across the top of the mold cavity therein above said bottom plate and said core in said upright position of the mold frame and to extend horizontally beneath the mold cavity in said inverted position of the mold frame;

and a vertically displaceable horizontal platform beneath the mold frame for engaging the pallet from below in said inverted position of the mold frame and for carrying the pallet down away from the inverted mold frame after said clamp means has released the pallet from the inverted mold frame;

the improvement:

wherein said opposite ends of the mold frame have outwardly-facing recess means therein on opposite sides of said pivot shafts;

and further comprising two pairs of locking members respectively supported by said upstanding supports at said opposite ends of the mold frame, with the locking members of each pair being respectively located on opposite sides of the corresponding pivot shaft and being slidably mounted for horizontal displacement between an outwardly retracted position spaced beyond the adjacent end of the mold frame and an inner position snugly received in the corresponding recess means in the adjacent end of the mold frame to hold the mold frame horizontal in both its upright and inverted positions.

4,005,973

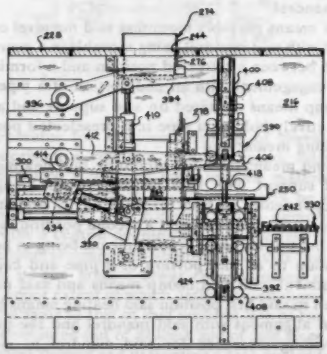
BLOCK MOLDING MACHINE HAVING PALLET SUPPLY MEANS

Milo G. Balhorn, Waterloo, Iowa, assignor to Old Fort International, Inc., Adrian, Mich.

Division of Ser. No. 544,137, Jan. 27, 1975, Pat. No. 3,961,874. This application Feb. 12, 1976, Ser. No. 657,373

Int. Cl.² B28B *3/04*

U.S. Cl. 425—443 **3 Claims**



1. In a block molding machine, a frame, a moldbox sup-

ported by the frame and open at the bottom under which a pallet can be supported during block molding operations, a mechanism supported by the frame and extending under the moldbox for supporting and lowering a block-loaded pallet from said moldbox and subsequently for raising and supporting against the bottom of the moldbox the next succeeding pallet, a pallet magazine supported by said frame on the rearward side of said moldbox and having a discharge portion open on the lower front side for releasing the lowermost pallet therein for transfer forward to said moldbox, said pallet magazine having an inlet portion for receiving pallets fed singly thereto, an ejector and pallet feed mechanism mounted on said frame for ejecting in a forward direction the block-loaded pallet from under said moldbox and as an incident to the ejecting action to remove the lowermost pallet from said magazine and to transfer it to said moldbox for being raised by said mechanism, and an auxiliary pallet feeder mounted adjacent to said magazine for feeding pallets singly to the magazine, said auxiliary pallet feeder including a storage hopper in which pallets can be stored for feeding to said magazine.

4,005,974

MOLD-CLOSING UNIT, PARTICULARLY FOR INJECTION-MOLDING MACHINES

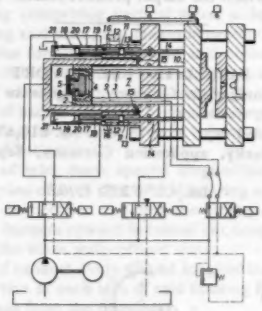
Tibor Szabo, Ludenscheid, Germany, assignor to Tibor Szabo, Ludenscheid, Germany

Filed Jan. 24, 1975, Ser. No. 543,919

Claims priority, application Germany, Jan. 29, 1974, 2404105

Int. Cl.² B29F *1/00*; F15B *11/00*

U.S. Cl. 425—450.1 **11 Claims**



1. A mold-closing unit for injection molding machines having a double acting closing piston operating in a closing cylinder divided by the closing piston into two pressure medium filled working chambers interconnected via a closable connecting channel in the closing piston, at least one piston rod extending through one of the working chambers and connected to a movable mold part and attached to the closing piston, the improvement which comprises at least one auxiliary cylinder having a working chamber hydraulically connected to one of the working chambers of the closing cylinder and having an auxiliary piston slidable with a piston rod which piston rod is coupled to the closing piston to move simultaneously therewith, whereby the volume of the working chamber of the auxiliary cylinder is increased when the piston rod of the closing cylinder is inserted into the closing cylinder and is correspondingly reduced when the piston rod is retracted from the closing cylinder.

4,005,975

APPARATUS FOR CONNECTING TOGETHER PARTS OF FOAM PLASTICS

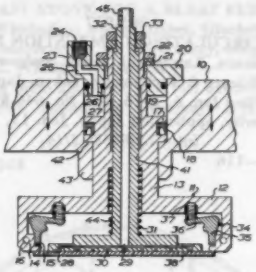
Sören Elof Mauritz Sollerud, Norrkoping, Sweden, assignor to Tetra Pak Developpement SA, Lausanne, Switzerland

Division of Ser. No. 422,812, Dec. 7, 1973, abandoned. This application Oct. 3, 1975, Ser. No. 619,433

Claims priority, application Sweden, Dec. 8, 1972, 16017/72

Int. Cl.² B29C *23/00*; B29D *27/00*, *9/00*

U.S. Cl. 425—500 **9 Claims**



1. An apparatus for connecting together first and second parts of foam plastics, comprising

a. a first holder means for the first part,

b. heating means movable relative to the first holder means from a retracted position to an active position where it applies heat against a surface of a first part in the first holder means to melt a portion thereof,

c. a second holder means for holding the second part at a position opposed to the first holder means when heat is being applied to the first part,

d. said first and second holder means being relatively movable between first and second positions, said first position being one in which a second part in the second holder means is so spaced from a first part in the first holder means as not to be influenced by the heat from the heating means when at its said active position, said second position being one in which the molten portion of the first part is engaged with the non-heated portion of the second part.

4,005,976

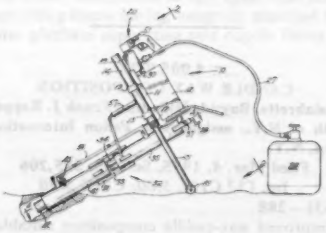
RODENT EXTERMINATOR

James L. Rombach, 2155 Nirvana St., Eugene, Oreg. 97401, and David W. Strebel, 4380 Hall Road, Santa Rosa, Calif. 95401

Filed Aug. 14, 1975, Ser. No. 604,553

Int. Cl.² F23D *13/00*

U.S. Cl. 431—13 **6 Claims**



1. A portable apparatus for discharging and igniting a quantity of flammable gas within a closed area, said apparatus comprising,

a frame including a support for ground engagement,

a barrel including nozzle means for discharge of the flammable gas, said barrel including adjustable means regulating the intake of ambient air into the barrel for mixing with the gas,

an igniter mounted within said barrel,

a gas control valve mounted on said frame,

a switch means mounted on said framework closing an electrical circuit to an ignition system serving said igniter means for ignition of the discharged gas.

4,005,977

GAS CIRCULATING COMBUSTION MEANS

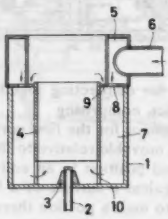
Yoshio Kawamura, Kawaguchi, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Jan. 6, 1976, Ser. No. 646,892

Claims priority, application Japan, Jan. 13, 1975, 50-6159

Int. Cl.² F23M *3/14*

U.S. Cl. 431—116 **1 Claim**



1. A gas circulating combustion means comprising an outer cylinder having one end thereof closed to serve as the bottom and the other end left open, an inner cylinder disposed inside said outer cylinder and an air feed cylinder, said combustion means being so constructed that a fuel discharge nozzle pointed in the direction of the interior of the outer cylinder is disposed at the bottom of the outer cylinder, a path for gas circulation is constituted by the inner cylinder, the outer cylinder and the bottom of said outer cylinder, said air feed cylinder is disposed at the end of the outer cylinder opposite the bottom of the outer cylinder to form a part of the enclosure of said gas circulation path and is provided with an air discharge opening for discharging air in the direction of the gas circulation path, a combustion gas suction inlet is disposed next to said air discharge opening between the air feed cylinder and the inner cylinder so that when the air is discharged via the air discharge opening into the gas circulation path, the resultant current of discharged air causes a part of the combustion gas existing in the inner cylinder to be withdrawn into the circulation path, and a reflux inlet adapted to admit the gas circulation path into the inner cylinder is disposed between one end of the inner cylinder and the bottom of the outer cylinder.

4,005,978

CANDLE WAX COMPOSITION

Peter J. Calabretta, Bayside Hills, and Frank J. Keppel, Brooklyn, both of N.Y., assignors to Felton International, Inc., Brooklyn, N.Y.

Filed Mar. 4, 1975, Ser. No. 555,206

Int. Cl.² C10L *5/00*; C11C *5/00*

U.S. Cl. 431—288 **7 Claims**

1. An improved wax-candle composition suitable for preparing a cast candle therefrom in a single pouring, said improvement comprising the combination of paraffin wax as the major component in said composition, and about 0.5% to 1.5% by weight of phthalic anhydride, said paraffin wax having a melting point between about 60° C and about 80° C.

4,005,979

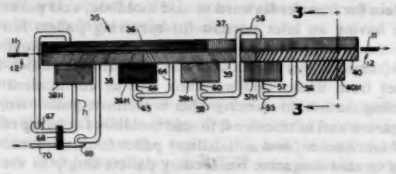
MULTISTAGE PROGRESSIVE DRYING METHOD

James Donald Brock, Chattanooga, Tenn., assignor to Astec Industries, Inc., Chattanooga, Tenn.

Division of Ser. No. 453,839, March 22, 1974, Pat. No. 3,923,449. This application July 3, 1975, Ser. No. 593,102

Int. Cl.² F27B *9/28*

U.S. Cl. 432—8 **5 Claims**



1. Method of heating a carpet product to remove moisture therefrom, while serially passing the carpet product through a plurality of heating zones so that the carpet product initially passes through a first heating zone and subsequently passes through a second heating zone, comprising the steps of:

subjecting the carpet product to heated fluid within each of said plural heating zones, so that moisture associated with the carpet product passing through a heating zone is at least partially removed by evaporation from the carpet product within the heating zone;

withdrawing a first volume of fluid from only said first heating zone and exhausting said withdrawn fluid to atmosphere without any further moisture removing exposure of the withdrawn fluid to the carpet product;

supplying said first heating zone with a volume of make-up fluid which is withdrawn only from said second one of said plural heating zones and which is substantially equal in volume to said first volume less the volume of moisture removed from the carpet product within said first zone; and

admitting make-up fluid from a source external to all of said heating zones, to only the last of said plural heating zone through which the carpet product passes.

4,005,980

SATELLITE TUBE SUPPORT

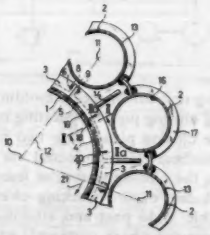
Paul Abel, Ennigerloh, Germany, assignor to Polysius AG, Neubeckum, Germany

Filed Sept. 5, 1975, Ser. No. 610,675

Claims priority, application Germany, Sept. 19, 1974, 2444817

Int. Cl.² F27D *15/02*

U.S. Cl. 432—80 **16 Claims**



1. In a rotary tube assembly for heat exchange between solid and gas having a plurality of axially extending satellite cooler tubes uniformly distributed around the outer periphery of a rotary tube in the vicinity of the exit end thereof, and supporting means for mounting the satellite tubes on the rotary tube; the improvement wherein said supporting means comprises a plurality of like support elements each constituting one circumferential segment of an annular ring adapted to surround

said rotary tube in closely fitting relationship thereto, securing means for detachably securing said support elements to each other to form a continuous support ring, seating means on each support element for engaging at least one of said satellite tubes to locate and support said satellite tubes on said rotary tube, and abutment means on said rotary tube and said support elements for detachably mounting said ring on said rotary tube, said abutment means being engageable with each other to limit said continuous support ring in circumferential and axial movement relative to said rotary tube.

4,005,981

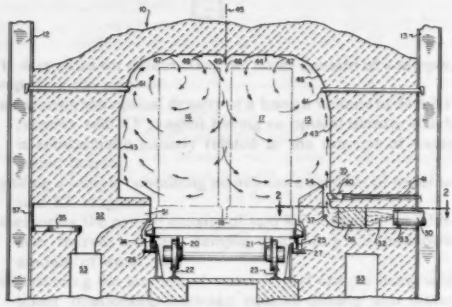
TUNNEL KILN

John E. Turnbull, Brookville, Pa., assignor to Hanley Company, Summerville, Pa.

Filed Apr. 28, 1975, Ser. No. 572,629

Int. Cl.² F27B *9/00*

U.S. Cl. 432—144 **16 Claims**



1. A continuous tunnel kiln firing section comprising:

an elongated housing through which stacks of ware to be fired may be moved;

said housing comprising vertical sides, a horizontal roof connecting said sides, and means between the lower ends of the sides forming the base of said housing, said base means including means for continuously transporting the stacks of ware through said housing,

a plurality of excess-air burners spaced along each side of said housing for generating high volume swiftly moving streams of hot gases;

a plurality of inlet ducts spaced longitudinally along the lower portion of each side of said housing and connected with said burners for directing the streams of hot gases from said burners upward in lateral non-longitudinal flow adjacent the inner walls of said sides;

a plurality of exhaust ducts spaced longitudinally along the lower portion of each side of said housing for exhausting excess gases from the housing;

said inlet and exhaust ducts being spaced relative to each other such that said hot gases circulate laterally over along the roof of said housing, laterally downward and through the stacks of ware to be fired, and are drawn upward again in substantially the same lateral flow path with the swiftly moving streams of hot gases from said burners to form a powerful lateral recirculating current of hot gases which provides substantially uniform temperatures on a given lateral plane throughout the stacks of ware to be fired.

4,005,982

HOT-BLAST STOVE FOR A BLAST FURNACE

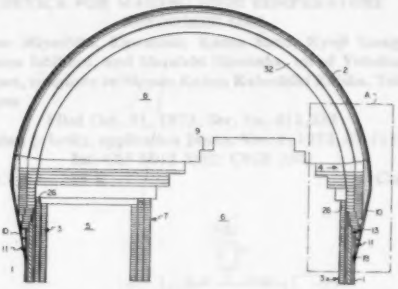
Helmut Palz, Wiesbaden; Rudolf Hebel, Ginsheim, and Otto Bauersachs, Saarbrucken, all of Germany, assignors to Didier-Werke AG, Wiesbaden, Germany

Filed Sept. 25, 1975, Ser. No. 616,897

Claims priority, application Germany, Sept. 28, 1974, 2446407

Int. Cl.² F27B *14/08*

U.S. Cl. 432—248 **12 Claims**



1. A hot-blast stove comprising:

a vertically extending metallic shaft casing having therein a refractory shaft lining surrounding a combustion shaft chamber and a grating shaft, said shaft casing including a lower cylindrical section and an upper funnel-shaped widened section integrally joined to said cylindrical section and flaring upwardly and outwardly therefrom;

a metallic cupola casing having a configuration of part of a sphere of a diameter greater than that of said cylindrical section, said cupola casing being integrally joined to said shaft casing at the upper end of said funnel-shaped widened section thereof, said cupola casing having therein a refractory cupola lining;

an annular supporting frame positioned within and rigidly attached to said funnel-shaped widened section, said supporting frame surrounding said shaft lining and being free of direct attachment to said cylindrical section; and

said supporting frame having integrally attached thereto an annular platform supporting said cupola lining.

4,005,983

METHOD AND APPARATUS FOR COLORIMETRIC ANALYSIS

Harald Dahms, 22 Lakeview Road, Ossining, N.Y. 10562

Division of Ser. No. 297,597, Oct. 16, 1972, abandoned, which is a continuation of Ser. No. 89,228, Nov. 13, 1970, abandoned. This application June 21, 1974, Ser. No. 481,803

Int. Cl.² G01N *31/22, 33/18*

U.S. Cl. 23—230 R 7 Claims

1. A method for determining the water content of a sample, comprising the steps of:

measuring the optical density of a known volume of first KF reagent, said KF reagent having an optical density which is substantially linearly related to the amount of water added thereto,

adding a sample containing an unknown amount of water to said KF reagents

measuring the optical density of said KF reagent after addition thereto of said sample containing an unknown amount of water, and

determining the amount of water in said sample using said linear relationship between optical density and water content of said KF reagent.

4,005,984

DIAGNOSTIC COMPOSITION AND METHOD OF USING THE SAME

Reese Fell Alsop, Lloyd Lane, Lloyd Neck, Huntington, N.Y. 11743

Continuation-in-part of Ser. No. 578,771, May 16, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,550

Int. Cl.² G01N *33/16*

U.S. Cl. 23—230 B 9 Claims

1. A diagnostic composition for the detection of occult blood in stools consisting essentially of an intimate mixture of chemical reagents selected from the group consisting of guaiac, glacial acetic acid, hydrogen peroxide, barium peroxide, benzidine dihydrochloride, and o-tolidine and a lubricant.

4,005,985

CATALYTIC REACTOR

Thomas Hutson, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 7, 1972, Ser. No. 216,100

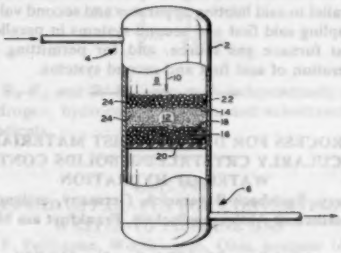
Int. Cl.² B01J *8/02*; C07C *3/34*

U.S. Cl. 23—288 R 4 Claims

1. In a catalytic reactor for the dehydrogenation of a paraffinic hydrocarbon material feed stream flowing through the reactor from an inlet to an outlet end of the reactor and having a platinum-tin promoted zinc aluminate catalyst layer in the reactor traversing the direction of flow of the feed stream therethrough, the improvement comprising:

a first layer of silica-free particles positioned in contact with a lower surface of the platinum-tin promoted zinc aluminate catalyst between said catalyst and the outlet of the reactor, said first layer covering substantially the entire lower surface of said catalyst; and

a second layer of silica-free particles positioned in contact with an upper surface of said catalyst between said catalyst and the inlet of the reactor, said second layer covering substantially the entire upper surface of said catalyst.



4,005,986

DEVICE FOR MAKING HIGH TEMPERATURE REFORMED GAS

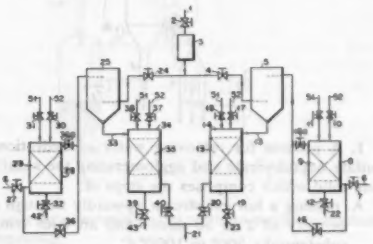
Tsuneo Miyashita, Kawasaki; Kazuo Sano; Kyoji Sasaguri; Kazuo Ishihara, and Shunichi Hironaka, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1973, Ser. No. 411,333

Claims priority, application Japan, Nov. 6, 1972, 47-111006

Int. Cl.² B01J *8/02*; C01B *2/02*

U.S. Cl. 23—288 R 9 Claims



1. A device for making high temperature reformed gas mainly comprising hydrogen and carbon monoxide, said device comprising:

a source of coke oven gas (1);

a source of blast furnace gas (6);

a continuous heating apparatus (3) coupled to said coke oven gas source for preheating the coke oven gas (1);

a first system including:

a first intermittent heat exchanger (8) coupled to said blast furnace gas source and containing therein a packing bed (9) of the heat-accumulator type for preheating the blast furnace gas (6);

a first separate cyclone-type gas mixing chamber (5) having a first inlet coupled to the output of said continuous heating apparatus (3) and a second inlet coupled to the output of said first intermittent heat exchanger (8) for mixing the two preheated gases (1 and 6); and

a first intermittent reforming furnace (14) coupled to the output of said separate cyclone-type gas mixing chamber (5) and containing therein a packing bed (15) of the heat-accumulator type impregnated with a catalyst for a reforming reaction; and

a second system including a second intermittent heat exchanger (28), a second separate cyclone-type gas mixing chamber (25) and a second intermittent reforming furnace (34) coupled together and to said continuous heat-

ing apparatus (3) and blast furnace gas source as the corresponding elements in said first system; and

first valve means coupling said first and second systems in parallel to said heating apparatus and second valve means coupling said first and second systems in parallel to said blast furnace gas source, and for permitting alternate operation of said first and second systems.

4,005,987

PROCESS FOR DRYING MOIST MATERIALS, PARTICULARLY CRYSTALLINE SOLIDS CONTAINING WATER OF HYDRATION

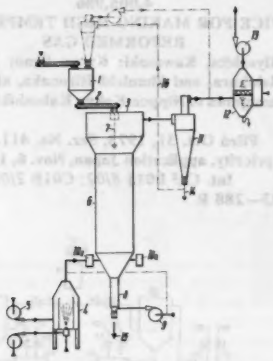
Egon Jury, Egelsbach-Bayerseich, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sept. 30, 1974, Ser. No. 510,738

Claims priority, application Germany, Oct. 1, 1973, 2349211

Int. Cl.² C01G *49/14*

U.S. Cl. 23—313 FB **2 Claims**



1. A process for removing water of hydration from iron sulfate heptahydrate and agglomerating the resulting crystalline solid which comprises the steps of:

A. passing a hot gas stream upwardly through a shaft at a velocity of 2 to 30 m/sec and an inlet temperature of substantially 500° to 1000° C,

B. introducing particles of said crystalline solid into said shaft at an upper portion thereof,

C. permitting said particles to descend in counterflow to said gas stream whereby said particles agglomerate while water of hydration is driven off,

D. cooling the agglomerated material at a lower portion of said shaft below that at which said hot gas stream is introduced by treating the agglomerated material with cold air,

E. recovering fine particles from said hot gas stream upon its emergence from said shaft, and

F. adding the recovered fine particles to the solid introduced into said shaft.

4,005,988

INTERLAYER FOR TRANSIENT LIQUID PHASE DIFFUSION BONDING

Daniel Francis Paulonis, Moodus; David Scott Duvall, Cobalt, and Gerard Casimer Sikorowicz, Kensington, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 19, 1975, Ser. No. 642,626

Int. Cl.² B32B *15/00*

U.S. Cl. 29—194 **12 Claims**

1. A diffusion bonding assembly which comprises:

two superalloy substrates having matched surface portions to be joined;

a thin interlayer sandwiched between the surfaces, said interlayer comprising at least one coating bonded to at least one of the substrate surfaces to be joined;

the overall interlayer composition having as its basis metal the same base metal as the superalloys and, containing a high boron content, having a melting temperature below that of the superalloys and a melting temperature below that causing irreversible adverse metallurgical change in the substrates.

4,005,989

COATED SUPERALLOY ARTICLE

Noel Butters Preston, Somers, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jan. 13, 1976, Ser. No. 648,853

Int. Cl.² B32B *15/20*

U.S. Cl. 29—194 **9 Claims**

1. A coated article comprising:

a superalloy substrate,

a first coating thereon consisting essentially of an aluminide of the basis metal of the substrate, and

an MCrAlY coating thereover,

where M is selected from the group consisting of nickel, cobalt, and iron.

4,005,990

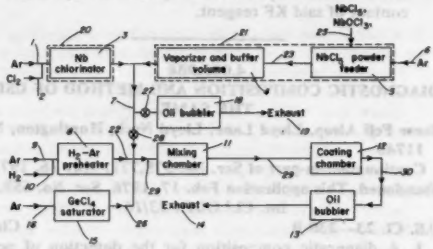
SUPERCONDUCTORS

Lawrence R. Newkirk, Los Alamos, and Flavio A. Valencia, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 26, 1975, Ser. No. 590,747

Int. Cl.² B23P *3/00*; C23C *27/02*

U.S. Cl. 29—196 **12 Claims**



1. The composition of matter which comprises material of the general formula Nb_3Ge containing about 1 to about 10 at. % oxygen.

4,005,991

METAL MADE OF STEEL PLATE AND ALUMINUM MATERIAL

Yositaka Uebayasi; Hiroshi Kumon; Michinobu Yamada, and Yoshikazu Oe, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Continuation of Ser. No. 317,684, Dec. 22, 1972, abandoned. This application Oct. 16, 1975, Ser. No. 623,005

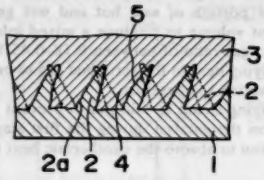
Claims priority, application Japan, Dec. 29, 1971, 47-3108

Int. Cl.² B32B *15/18*, *15/20*

U.S. Cl. 29—196.2 **8 Claims**

1. A metal composite comprising a steel plate having a desired shape and an aluminum material permanently bonded by being cast onto said steel plate on at least one of the opposed surfaces of said steel plate, said one of the surfaces of said steel plate having thereon a plurality of teeth spaced at predetermined intervals therealong to define primary interstices therebetween, each of said teeth being raised up from,

extending outwardly from and being integral with said one of the surfaces of said plate, each of said teeth being inclined relative to the plane of said one of said surfaces of said steel plate and also to a plane perpendicular to said plane of said one of said surfaces of said steel plate, and each of said teeth having on a surface thereof a plurality of surface irregularities, and said irregularities having irregular interstices therebetween, said aluminum material extending into the primary and



irregular interstices thereby to provide a firm interlock between said steel plate and said aluminum material, said surface irregularities being formed by the step of driving a chisel into the one surface of the steel plate at an angle to the plane of the surface of the plate for raising the teeth up out of the surface of the plate, the surface irregularities being formed naturally on the surfaces of the teeth as the teeth are raised out of the surface of the plate.

4,005,992

NOVEL GASOLINE COMPOSITIONS AND ADDITIVES THEREFOR

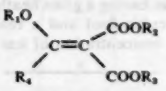
Leonard M. Niebylski, Birmingham, and Ellis B. Rifkin, Southfield, both of Mich., assignors to Ethyl Corporation, Richmond, Va.

Filed Mar. 8, 1976, Ser. No. 664,504
Int. Cl.² C10L 1/22
U.S. Cl. 44—68 **23 Claims**

1. As a composition of matter, a gasoline for an internal combustion engine comprising

i. an antiknock amount of a cyclopentadienyl manganese tricarbonyl antiknock compound, and

ii. an amount sufficient to reduce plugging of an exhaust gas catalyst of a compound having the general formula:



wherein R_1, R_2 and R_3 are independently selected from hydrogen, hydrocarbyl radicals, and substituted hydrocarbyl radicals, and R_4 is selected from hydrogen, hydrocarbyl radicals, substituted hydrocarbyl radicals, hydrocarbyloxy radicals, or hydrocarbyloxycarbonyl radicals.

4,005,993

NOVEL GASOLINE COMPOSITIONS

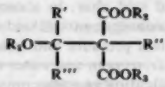
Leonard M. Niebylski, Birmingham, and Ellis B. Rifkin, Southfield, both of Mich., assignors to Ethyl Corporation, Richmond, Va.

Filed Mar. 8, 1976, Ser. No. 664,505
Int. Cl.² C10L 1/22
U.S. Cl. 44—68 **26 Claims**

1. As a composition of matter, a gasoline for an internal combustion engine comprising

i. an antiknock amount of a cyclopentadienyl manganese tricarbonyl antiknock compound, and

ii. an amount sufficient to reduce plugging of an exhaust gas catalyst of a compound having the general formula:



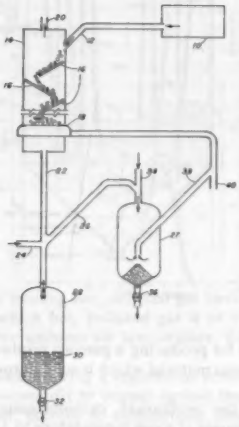
wherein R_1–R_3 and R'-R''' are each independently selected from hydrogen, hydrocarbyl radicals, and substituted hydrocarbyl radicals.

4,005,994

PROCESS AND APPARATUS FOR CONVERTING SOLID WASTES TO PIPELINE GAS

Herman F. Feldmann, Worthington, Ohio, assignor to Syngas Recycling Corporation, Toronto, Canada

Filed Dec. 22, 1975, Ser. No. 643,358
Int. Cl.² C10J 3/00
U.S. Cl. 48—111 **15 Claims**



1. Apparatus for converting solid waste to methane-containing gas comprising:

a methane-containing gas production reactor including means for delivering solid wastes of given moisture content to input duct means of an elongate confined zone of said methane-containing gas production reactor, said elongate zone and said duct means being configured and arranged to effect movement of said wastes along said zone, said zone being under pressure;

means for introducing synthesis gas exhibiting a given thermal energy to said zone at a location remote from said input duct means, said synthesis gas including a mixture of carbon monoxide, carbon dioxide, hydrogen, and water vapor;

said zone being configured and arranged with respect to said delivery of said wastes and said synthesis gas to control the rate of passage of the wastes through the zone, said means introducing said synthesis gas being situated to effect movement of said gas along said zone in a direction countercurrent to and confronting said moving wastes, whereby, as said wastes move through said zone there is a progressive diminution of said moisture in said wastes, said synthesis gas and said wastes being in contact and under sufficient temperature and pressure to partially convert the wastes into methane-containing gas, and there is produced a carbon containing char;

means for removing the methane-containing gas from the zone;

means for effecting the withdrawal of the char from the zone;

a gasification reactor and means for delivering oxygen and water vapor and said char, in a condition substantially free of inorganic components of said wastes, to said reactor under sufficient pressure and temperature to convert a part of said char, oxygen and water vapor to said synthesis gas, said gasification reactor comprising the source of synthesis gas delivered to said zone; and

means for delivering the synthesis gas from the gasification reactor to said introducing means.

4,005,995

PROCESS FOR PRODUCING A GASEOUS PRODUCT FROM CARBONACEOUS MATERIAL

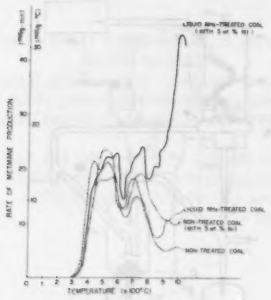
Yasukatsu Tamai; Yoshiyuki Nishiyama, and Minoru Mitida, all of Sendai, Japan, assignors to Tohoku University, Japan

Filed Oct. 1, 1975, Ser. No. 618,583

Claims priority, application Japan, Mar. 26, 1975, 50-036497

Int. Cl.² C10J 3/06

U.S. Cl. 48—197 R **9 Claims**



1. A process for producing a gaseous product from particulate carbonaceous material which is solid at room temperature comprising:

pretreating the particulate carbonaceous material with liquid ammonia at room temperature to 150° C to extract out of said carbonaceous material at least about 80% of the substances extractable with liquid ammonia;

separating the carbonaceous material from the liquid ammonia; and

treating the resultant carbonaceous material with a gasifying agent at a temperature of 400° to 1,000° C under a pressure ranging from atmospheric pressure to superatmospheric pressure in the presence or absence of a catalyst to obtain a gaseous product.

4,005,996

METHANATION PROCESS FOR THE PRODUCTION OF AN ALTERNATE FUEL FOR NATURAL GAS

Arthur L. Hausberger, Jeffersontown, Ky., and Gene A. Hammons, El Paso, Tex., assignors to El Paso Natural Gas Company, El Paso, Tex.

Filed Sept. 4, 1975, Ser. No. 610,163

Int. Cl.² C10J 1/00

U.S. Cl. 48—197 R **11 Claims**

1. A process for the catalytic enrichment of a scrubbed feed gas, derived from the gasification of coal, and which has been scrubbed for the partial removal of carbon dioxide which includes the methanation of carbon oxides in multiple stages to produce a methane rich gas of pipeline quality, in which,

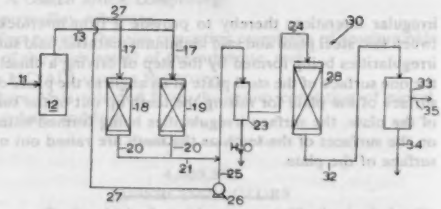
A. said scrubbed feed gas comprises hydrogen, methane and carbon oxides, the carbon oxides being present in a concentration of from 15 to 25 mole %, the carbon dioxide representing less than 4% of the said scrubbed gas and said hydrogen being present in at least a stochiometric amount sufficient to produce a minimum H_2:CO ratio of 3:1, and a maximum H_2:CO ratio no greater than 4:1;

B. the improvement which includes reacting hydrogen and carbon oxides over a highly active catalyst in a first methanation stage to produce methane and steam at an inlet temperature sufficiently high to initiate the methanation reaction and at an outlet temperature no greater than 1050° F. to produce a hot and wet product gas and

C. recycling a portion of said hot and wet product gas to said scrubbed feed gas at such a rate to provide a ratio of recycle to feed gas of no greater than 5:1 and mixing said recycled portion of said hot and wet gas therewith in sufficient volume to produce a mixed inlet gas having a steam to gas ratio of between 0.18–0.45:1, thereby:

1. supplying heat to the scrubbed gas to bring said gas up to reaction temperature,

2. supplying steam to said gas to prevent carbon deposition on the catalyst during the first stage of methanation and to absorb the exothermic heat of reaction and



3. modifying the gas composition so as to bring said composition out of the carbon forming range by reducing the monoxide concentration to a level of less than 5.5% while simultaneously increasing the methane concentration by a factor in excess of 4;

D. thereafter cooling the remaining portion of said product gas to a temperature of from 450° to 600° F.,

E. reacting the residual carbon oxides and hydrogen in a final methanation stage over a highly active catalyst at an inlet temperature at least sufficiently high to initiate the methanation reaction and at an outlet temperature of no greater than 850° F. to complete the methanation reaction and to reduce the residual hydrogen and carbon dioxide to a level of less than 6 mole %; and

F. cooling the gases from said final methanation stage to remove water therefrom and thereby produce a dry, methane rich gas having a gross heating value in excess of 940 BTU per cubic foot and a residual hydrogen and carbon dioxide concentration of less than 6 mole %.

4,005,997

GAS DEHYDRATION WITH LIQUID DESICCANTS AND REGENERATION THEREOF

Allan E. Fowler, and John E. Protz, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 24, 1975, Ser. No. 552,678

Int. Cl.² B01D 53/26

U.S. Cl. 55—32 **11 Claims**

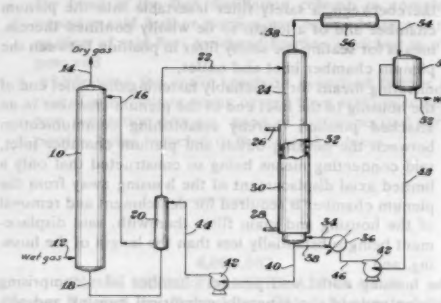
1. The method of increasing the dew point depression of a gas stream using low energy requirements which comprises

a. contacting a moisture laden gas stream with a substantially completely dehydrated liquid organic desiccant in a contacting zone to generate a gas stream having an increased dew point depression and a water rich liquid organic desiccant,

b. heating said water rich liquid organic desiccant from said contactor zone in a thermal reconcentration zone heated to a temperature varying between the boiling point of said water rich desiccant and the decomposition temperature of the pure desiccant whereby a major portion of the water is removed from said liquid desiccant,

c. contacting said partially dried liquid desiccant with a

hydrocarbon azeotroping agent which is substantially insoluble in said desiccant and which boils in the range from about 35° to about 235° C. or mixtures thereof, in an azeotroping zone uniformly heated to a temperature in the range from about 5° to about 40° C. below the decomposition temperature of the pure desiccant whereby substantially all the remaining water is removed from said liquid desiccant,



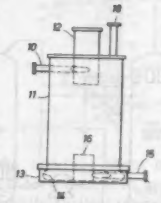
d. recovering the water-hydrocarbon azeotrope,
e. separating the hydrocarbon azeotrope from excess water,
f. recycling said azeotrope to said azeotroping zone,
g. recovering a dehydrated organic desiccant, and
h. recycling said dehydrated desiccant to said contacting zone.

4,005,998

SEPARATION PROCESS

John E. Gorman, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 549,268, Feb. 12, 1975, abandoned. This application Apr. 1, 1976, Ser. No. 672,803
Int. Cl.² B01D *45/16*
U.S. Cl. 55—84 **2 Claims**



1. A process for the separation of polymeric particulate solids from their heated admixture with gases in a vertically-disposed cylindrical separator having an upper section and a lower section, said lower section terminating in an interior circumferential groove containing a tangentially-positioned solids outlet, which process comprises:

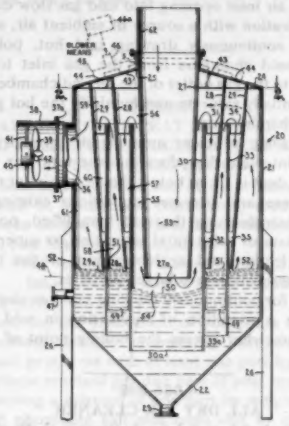
a. injecting the admixture at a vapor velocity of at least about 700 feet per second through from a jet inlet positioned tangentially in said upper section;
b. withdrawing the major portion of said gases through a gas outlet positioned in said upper section;
c. passing the solids and residual portions of the gases in a tangential path down the inner surface of said cylindrical separator to a bottom plate communicating with said interior circumferential groove, said bottom plate having centrally-positioned thereto a vertically-disposed means for reducing turbulence in the flow pattern of the solids and residual gases, said vertically disposed means having a water inlet for injection of water into the lower section of the separator;
d. injecting water through said water inlet at a rate of between about 0.5 and 3.5 parts by weight per 100 parts by weight of solids; and
e. withdrawing the solids through said tangentially-positioned solids outlet.

4,005,999

VAPOR REACTOR

Drexel T. Carlson, 2909 W. 93rd St. Terrace, Leawood, Kans. 66206

Filed Mar. 3, 1975, Ser. No. 554,631
Int. Cl.² B01D *47/02*
U.S. Cl. 55—93 **30 Claims**



1. A process of treating hot, polluted gas having particulate matter therein, which hot, polluted gas is at a temperature substantially above ambient air temperature, comprising the steps of:

sequentially twice drawing a continuous stream of the polluted gas downwardly to impact against the surface of a body of water, thereby to substantially saturate and humidify the hot gas stream,
each time while passing the gas stream under a separate barrier subsequent to each impact, each barrier closely approaching the water body surface,
with the said humidified, polluted gas stream being drawn upwardly between said impacts into an ambient air addition zone,
each impaction serving both to humidify the hot polluted gas stream and remove some of the larger particles carried thereby therefrom,
continuously mixing ambient air having a lower temperature than that of the humidified, particulate carrying, polluted gas stream with the said gas stream in said ambient air addition zone between the impacts thereof on the surface,
sufficient ambient air being added to said gas stream in said zone to take the total gas volume in the ambient air addition zone below the dew point at the overall temperature and pressure conditions existing in said zone,
thereby transforming the said humidified, polluted gas stream from a state of substantial saturation to supersaturation with nucleation and agglomeration of the particulate matter therewithin into larger particles,
all of the said operations on said hot polluted gas stream taking place within continuously connected, confined spaces, whereby the drawing of said stream therethrough creates a rarefaction which somewhat lowers the boiling point of the water.

24. A gas scrubber for scrubbing hot, polluted gas containing particulate matter, which hot, polluted gas is at a temperature substantially above ambient air temperature, comprising, in combination:

a pair of enclosed chambers each having a body of water in the lower portion thereof,

a substantially vertical wall in each chamber dividing at least the upper portion of the space over the water body therein into two zones, each said wall closely approaching the surface of the water body in each chamber with its lowermost extremity,

the upper portion of one zone of each chamber having a gas inlet and the upper portion of the other zone of each chamber having a gas outlet,

a gas flow duct connecting the gas outlet of a first one of said chambers and the gas inlet to the second of said chambers,

an ambient air inlet opening into said gas flow duct and in communication with a source of ambient air, and

means for continuously drawing said hot, polluted gas through said chambers from the gas inlet to the first chamber to the gas outlet of the second chamber, thereby to substantially saturate and humidify the hot gas stream in each chamber, and

further drawing sufficient ambient air through said inlet opening into said flow duct that the total gas volume in said flow duct is taken below the dew point at the overall temperature and pressure conditions existing therein, thereby transforming the said humidified, polluted gas from a state of substantial saturation to supersaturation with nucleation and agglomeration of the particulate matter therewithin into larger particles,

said means for continuously drawing said gas also operative to create a condition of rarefaction in said chambers which somewhat lowers the boiling point of the water therein.

4,006,000

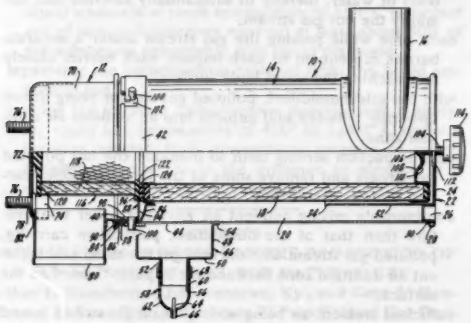
ALL DRY AIR CLEANER

Domenic P. Tortorici, and John J. Dreznes, both of Chicago, Ill., assignors to United Filtration Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 477,043, June 6, 1974, abandoned. This application Feb. 7, 1975, Ser. No. 547,808

Int. Cl.² B01D *50/00*

U.S. Cl. 55—323 **6 Claims**



1. An air cleaner assembly comprising:

a generally cylindrical housing having a dirty air inlet through the housing, said inlet being connected tangentially to the housing and arranged therewith to set up a helical swirling motion of the air in the housing, a clean air outlet opening through one end of the housing, the opposite end of the housing being closed to prevent the flow of air therethrough,

a generally cylindrical main filter insertable into the housing and of a length to be wholly confined therein,

means secured to the housing for supporting and generally axially aligning the main filter within the housing, said filter having an outside diameter less than the inside diameter of the housing so as to partially define a generally cylindrical air swirl zone between the filter and housing,

a separate plenum chamber having a sidewall and an end surface closing one end, an inlet through the other end of the plenum chamber constructed to be coupled with the housing outlet to receive clean air therefrom, and an outlet through the side wall of the plenum chamber constructed for connection to an air intake of an internal combustion engine to establish communication of air therebetween, a safety filter insertable into the plenum chamber and of a length to be wholly confined therein, means for seating the safety filter in position between the plenum chamber inlet and outlet,

connecting means for detachably fastening the outlet end of the housing to the inlet end of the plenum chamber in an attached position thereby establishing communication between the housing outlet and plenum chamber inlet, said connecting means being so constructed that only a limited axial displacement of the housing away from the plenum chamber is required for detachment and removal of the housing and main filter therewith, said displacement being substantially less than the length of the housing, and

the housing outlet and plenum chamber inlet comprising open ends of the generally cylindrical housing and plenum chamber respectfully, said ends being so constructed as to fit one within the other in generally circumferential engagement in the attached position, thereby cooperating with said connecting means to fasten the housing and plenum chamber together.

4,006,001

PRODUCTION OF INTERMEDIATE PURITY OXYGEN BY PLURAL DISTILLATION

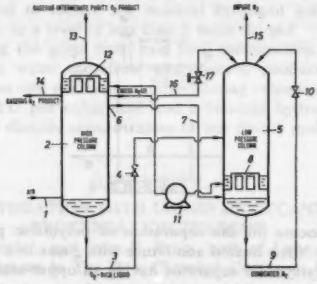
Eugen Schonpflug, Munich, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Jan. 20, 1975, Ser. No. 542,270

Claims priority, application Germany, Jan. 18, 1974, 2402246

Int. Cl.² F29J *3/02*

U.S. Cl. 62—29 **3 Claims**



1. A low-temperature separation process for the production from air of oxygen of intermediate purity containing about 35 to 95% by volume oxygen, comprising:

a. subjecting air to low temperature rectification in a first distillation column operating under superatmospheric pressure to obtain a bottoms fraction enriched in oxygen and first overhead vapor enriched in nitrogen;

b. passing said bottoms fraction to a second distillation column operating at a pressure lower than said first column, said second and first columns being spaced apart and distinct from one another, and further distilling said bottoms fraction to obtain a bottoms liquid product of intermediate purity oxygen and a second overhead fraction enriched in nitrogen;

c. passing a portion of said first overhead fraction enriched with nitrogen from said first column into the bottom of

said second column in indirect heat exchange relationship with said bottom liquid product of intermediate purity oxygen to vaporize a portion of said intermediate purity oxygen to be used as vapor boil-up in said second column and to condense said first overhead fraction enriched in nitrogen;

d. pumping a further portion of said bottoms liquid product of intermediate purity oxygen to a condenser located at the head of the first distillation column to completely vaporize said further portion and to condense a further portion of said first overhead fraction enriched in nitrogen; and

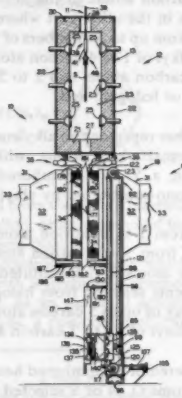
e. withdrawing the entire resultant vaporized further portion of intermediate purity oxygen from said low temperature separation process, none of said vaporized further portion being recycled to the second column.

4,006,002

GLASS SHEET TRANSFER APPARATUS

Thomas Hetman, Jr., Perrysburg, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Oct. 15, 1975, Ser. No. 622,687
Int. Cl.² C03B *27/00*
U.S. Cl. 65—114 **18 Claims**



1. An apparatus for handling sheet material comprising: means for gripping a sheet adjacent its upper edge to suspend the same in a substantially vertical plane, means moving said sheet bodily in a generally downwardly vertical path, a support below said sheet for receiving the bottom edge of said sheet, means for moving said support in the direction of movement of said sheet at an accelerating speed until said support reaches the same rate of speed as said sheet and is spaced in close proximity thereto, and means responsive to the close positioning of said support to the bottom edge of said sheet for releasing said sheet from said gripping means and effect a transfer of said sheet from said gripping means to said support without interruption of the downward movement of said sheet.

13. A method of handling sheet material comprising: gripping a sheet solely adjacent the upper edge thereof for suspending the same in a substantially vertical plane, moving said supported sheet bodily downwardly in a generally vertical path, moving a glass receiving support below said sheet in the direction of movement of said sheet at an accelerating speed until said support reaches the same rate of speed as the rate of speed of said sheet and is spaced in close proximity thereto, releasing the upper edge of said sheet, and receiving the bottom edge of said sheet on said support during continuous movement thereof in said vertical path.

4,006,003

PROCESS FOR MELTING GLASS

Valdis R. Daiga, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 29, 1975, Ser. No. 626,692
Int. Cl.² C03B *5/04*
U.S. Cl. 65—135 **8 Claims**

1. In a method of manufacturing glass comprising discharging glass forming ingredients unto a pool of molten glass and burning a combustible fuel above the surface of said pool so as to produce a source of heat to convert said ingredients to a molten glass the improvement wherein said fuel is a preslurried mixture of a coal and oil.

4,006,004

PHOSPHATE ENRICHED PEAT MOSS FERTILIZER AND METHOD THEREFOR INCLUDING FREE AMINO ACID SUPPLEMENTATION

Rupen B. Seferian, Pasadena; Roy M. Kaprielian, San Marino, and Joseph B. Michaelson, North Hollywood, all of Calif., assignors to Rupen B. Seferian, Pasadena and Roy M. Kaprielian, San Marino, both of, Calif.

Filed Aug. 25, 1975, Ser. No. 607,206
Int. Cl.² C05B *15/00*; C05F *11/02*
U.S. Cl. 71—11 **16 Claims**

1. Method for the production of phosphate enriched high organic content fertilizer comprising peat moss, including reacting said peat moss with at least one part by weight of an acid phosphate reactant per one part of peat moss, said reactant comprising a mixture of one part by weight of an alkali metal acid phosphate salt and from one to eight parts by weight of orthophosphoric acid, and recovering the product.

4,006,005

PHOSPHATE ENRICHED MANURE FERTILIZER AND METHOD THEREFOR INCLUDING FREE AMINO ACID SUPPLEMENTATION

Rupen B. Seferian, Pasadena; Roy M. Kaprielian, San Marino, and Joseph B. Michaelson, North Hollywood, all of Calif., assignors to Rupen B. Seferian, Pasadena and Roy M. Kaprielian, San Marino, both of, Calif.

Filed Aug. 25, 1975, Ser. No. 607,149
Int. Cl.² C05B *15/00*; C05F *3/00*
U.S. Cl. 71—11 **16 Claims**

1. Method for the production of phosphate enriched high organic content fertilizer comprising manure, including reacting said manure with at least one part by weight of an acid phosphate reactant per one part of manure, said reactant comprising a mixture of one part by weight of an alkali metal acid phosphate salt and from one to eight parts by weight of orthophosphoric acid, and recovering the product.

4,006,006

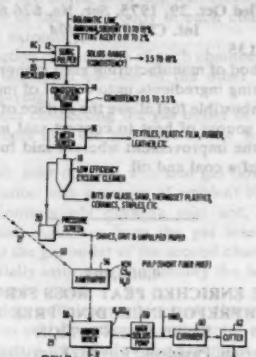
FERTILIZER

Ronald A. Penque, Glen Ridge, N.J., assignor to Biocel Corporation, New York, N.Y.

Division of Ser. No. 404,305, Oct. 9, 1973, Pat. No. 3,933,577, which is a continuation-in-part of Ser. No. 105,123, Jan. 8, 1971, Pat. No. 3,850,771. This application Mar. 10, 1975, Ser. No. 556,827
Int. Cl.² C05F *9/00*
U.S. Cl. 71—14 **9 Claims**

1. An anti-caking fertilizer product comprising a mixture of $MgNH_4PO_4$ and $CaNH_4PO_4$ and ingredients consisting of inks,

coatings, waxes and adhesives separated from waste paper, said phosphates being present in amounts sufficient to provide



desired concentrations and ratios of the soil nutrient atoms, N, P and Mg.

4,006,007

N-(SUBSTITUTED PHENYL) DERIVATIVES OF SACCHARIN

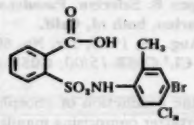
Frederic G. Bollinger, and John J. D'Amico, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 2, 1975, Ser. No. 537,989

Int. Cl.² A01N *5/00*; C07C *101/48*

U.S. Cl. 71—76 **10 Claims**

1. A compound having the formula



wherein n is 0 or 1.

4,006,008

1-ALKYLIDENEAMINOURACIL COMPOUNDS AND HERBICIDAL COMPOSITIONS

Gerhard Jäger; Jürgen Wenzelburger, both of Wuppertal; Ludwig Eue, and Robert Rudolf Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

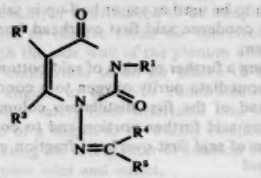
Filed Jan. 14, 1974, Ser. No. 433,165

Claims priority, application Germany, Jan. 16, 1973, 2301971

Int. Cl.² A01N *9/22*, *9/12*

U.S. Cl. 71—88 **42 Claims**

1. 1-Alkylideneaminouracil compound of the formula



(I)

wherein

R^1 is alkyl or substituted alkyl of up to 12 carbon atoms wherein the substitutent is selected from up to 3 members of the group consisting of halogen, nitrile or alkoxy of from 1 to 3 carbon atoms; or alkenyl and alkynyl of from 3 to 12 carbon atoms; cycloalkyl, cycloalkyl-alkyl of from 5 to 7 carbon atoms; mono-, di-, or tri-halo-cycloalkyl and alkylcycloalkyl of from 5 to 8 carbon atoms in the cycloalkyl moiety and up to 3 carbon atoms in the alkyl moiety; alkoxycycloalkyl of from 5 to 8 carbon atoms; alkoxycarbonylalkyl of from 1 to 4 carbon atoms in the alkoxy moiety and 1 to 2 carbon atoms in the alkyl moiety; alkylthioalkyl or alkoxyalkyl of from 1 to 4 carbon atoms in the alkoxy or alkylthio moiety and 1 to 6 carbon atoms in the alkyl moiety; aralkyl and substituted aralkyl of 6 or 10 carbon atoms in the aryl moiety and 1 or 2 carbon atoms in the alkyl part wherein the substitutents are selected from up to 3 members of the group consisting of halogen, alkyl of 1 to 4 carbon atoms, and haloalkyl of from 1 to 2 carbon atoms and 2 to 5 halogen atoms,

R^2 is hydrogen or halogen; and

R^3 is methyl or

R^2 and R^3 together represent an alkylene bridge of from 3 to 5 carbon atoms, which forms, with the two adjacent carbon atoms, a 5- to 7-membered ring and which is optionally mono-substituted by alkyl of from 1 to 3 carbon atoms;

R^4 is alkyl of from 1 to 6 carbon atoms, cycloalkyl or cycloalkenyl of from 5 to 7 carbon atoms or aryl of from 6 or 10 carbon atoms aryl substituted one to three times with substituents selected from halogen, alkyl, haloalkyl and haloalkoxy of up to 5 carbon atoms, alkoxy, alkylthio and alkylsulfonyl of up to 3 carbon atoms, hydroxyl, and nitro; or

R^4 is a 5-membered or 6-membered heterocyclic containing the hetero-atoms O, N or S selected from 2-furyl, 2-thienyl and 2-pyridinyl which may be substituted with substituents selected from halogen, haloalkyl and haloalkoxy, of up to 5 carbon atoms, alkoxy, alkylthio and alkylsulfonyl of up to 3 carbon atoms, hydroxyl, and nitro; and

R^5 is hydrogen, alkyl of from 1 to 6 carbon atoms, or unsubstituted or substituted aryl of from 6 or 10 carbon atoms where the substitutents are selected from up to 3 members of the group consisting of halogen, haloalkyl and haloalkoxy of up to 5 carbon atoms, alkoxy, alkylthio and alkylsulfonyl of up to 3 carbon atoms, hydroxyl and nitro.

4,006,009

1-THIADIAZOLYL-6-ACYLOXYTETRAHYDROPYRIMIDINONE HERBICIDES

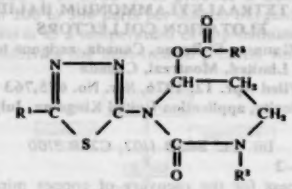
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed May 27, 1975, Ser. No. 580,636

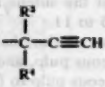
Int. Cl.² A01N *9/12*

U.S. Cl. 71—90 **10 Claims**

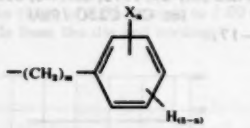
1. A compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromalkyl and



wherein R^3 and R^4 are each selected from the group consisting of hydrogen and lower alkyl; and R^5 is selected from the group consisting of lower alkyl, lower chloroalkyl, lower bromoalkyl, lower alkenyl, lower alkynyl, lower alkoxyalkyl, cycloalkyl of from 3 to 7 carbon atoms, and



wherein X is selected from the group consisting of lower alkyl, halogen, lower haloalkyl, nitro, cyano and lower alkoxy and *m* and *n* are each integers from 0 to 3.

10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim 1.

4,006,010

PRODUCTION OF BLISTER COPPER DIRECTLY FROM DEAD ROASTED-COPPER-IRON CONCENTRATES USING A SHALLOW BED REACTOR

Harold P. Rajcevic, Colonia; William R. Opie, Holmdel, and Dominic C. Cusanelli, South Plainfield, all of N.J., assignors to Amax Inc., New York, N.Y.

Filed May 30, 1975, Ser. No. 582,181
Int. Cl.² C22B *15/00*
U.S. Cl. 75—74 **9 Claims**

1. A method of producing blister copper from copper-iron sulfide concentrate containing by weight about 15 to 45% Cu, about 15 to 40% Fe, about 20 to 45% S, the total Cu, Fe and S content being at least about 85% and the balance gangue and residual metals which comprises,

dead roasting said sulfide concentrate at a temperature above 800° C to remove sulfur therefrom and form ferric iron oxide as evidenced by the formation of substantial amounts of magnetic copper ferrite,

forming a batch mixture of said roasted concentrate together with a slagging agent comprising SiO_2,

the amount of SiO_2 present being sufficient to combine with FeO reduced from said ferric iron oxide and provide a slag having a melting point below about 1250° C,

forming agglomerates from said batch mixture,

charging said agglomerates into a shallow bed reactor furnace together with an amount of carbonaceous material correlated to reduce copper oxide therein and ferric iron oxide to FeO and provide sufficient heat to effect smelting in said furnace, said charge forming a shallow bed disposed above a tuyere line located peripherally around said furnace, said shallow bed charge ranging up to about 6 feet in height, igniting said carbonaceous material in said shallow bed and blasting air through said bed via said tuyeres, thereby heating and rapidly smelting said batch by raising the temperature thereof in excess of the melting point of copper,

said charge being maintained in said furnace for a residence time of less than about 1 hour sufficient to reduce said copper oxide selectively to molten blister copper and reduce ferric iron oxide to ferrous oxide to combine with the SiO_2 present to form a molten slag, and

allowing said molten copper and said molten slag to settle by gravity in said furnace into a confining hearth located at the bottom of said furnace to produce a pool of blister copper with a layer of said molten slag on the top thereof.

4,006,011

CONTROLLED EXPANSION ALLOY

Donald R. Muzyka, Reinholds, and Donald K. Schlosser, Reading, both of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Continuation-in-part of Ser. No. 292,537, Sept. 27, 1972, abandoned, which is a division of Ser. No. 142,635, May 12, 1971, Pat. No. 3,705,827, and Ser. No. 314,113, Dec. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 142,635, May 12, 1971, Pat. No. 3,705,827. This application Feb. 26, 1974, Ser. No. 445,963
Int. Cl.² C22C *30/00*
U.S. Cl. 75—122 **12 Claims**

1. An austenitic precipitation hardening nickel-cobalt-iron base alloy consisting essentially by weight of about

Carbon	0.1% Max.
Manganese	0.50% Max.
Silicon	0.50% Max.
Chromium	0.5% Max.
Molybdenum	0.5% Max.
Nickel	35% to 40%
Cobalt	13% to 17%
Columbium	2.5% to 6%
Titanium	1.0% to 3%
Aluminum	0.1% to 2%
Boron	0.003% to 0.020%
Vanadium	up to 1%
Zirconium	up to 0.1%
Hafnium	up to 2%

and the balance consisting essentially of iron and incidental impurities.

4,006,012

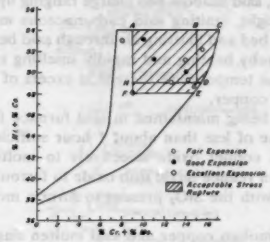
AUSTENITIC ALLOY

Lynn E. Kindlimann, Milford, Conn., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 406,723, Oct. 15, 1973, abandoned, which is a division of Ser. No. 100,078, Dec. 21, 1970, Pat. No. 3,843,332. This application Mar. 27, 1975, Ser. No. 562,619
Int. Cl.² C22C *19/03, 38/08, 38/10*
U.S. Cl. 75—122 **11 Claims**

1. A controlled expansion austenitic alloy having ferritic-like thermal expansion and high temperature strength, consisting essentially of, in weight percent, from 36 to 54% nickel, up to 12% cobalt, up to 11% chromium, up to 10% molybdenum, from 1 to 3.75% titanium, up to 0.35% aluminum, up to 0.1% carbon, up to 2% manganese, up to 1% silicon, up to 0.05% boron, balance essentially iron; said percentage of iron being at least 24%; said percentage of nickels plus said percentage of

cobalt and said percentage of chromium plus said percentage of molybdenum corresponding to the area ACEFA in FIG. 3; said percentage of nickel being effective nickel in accordance with the equation:

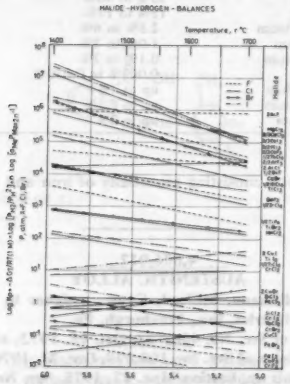


$$\% \text{ effective Ni} = \% \text{ actual Ni} - 2.4\,[(\% \text{ Ti} - 2.8) - 4(\% \text{ C})]$$

4,006,013
PROCESS FOR REFINING CARBONACEOUS ALLOYS OF IRON, NICKEL AND/OR COBALT

Simo Antero Ilvari Mäkipirtti, Nakkila, and John Henrik Relander, Pori, both of Finland, assignors to Outokumpu Oy, Finland

Continuation of Ser. No. 422,546, Dec. 6, 1973, abandoned. This application Apr. 29, 1975, Ser. No. 572,905
Claims priority, application Finland, Dec. 28, 1972, 3685/72
Int. Cl.² C22C *39/14*
U.S. Cl. 75—130.5 **10 Claims**



1. An improved process for refining an impure alloy containing a base metal and at least one of the metals iron, cobalt and nickel, in which the base metal tends to form a carbide, wherein a mixture of at least one halogen-containing material and hydrogen is added to a smelt of the alloy in which smelt the carbon content is between 4% and 8% in order to lower activity of the base metal, forming metal halides of impurities and withdrawing impurites in the form of their metal halides from the smelt.

4,006,014
USE OF TETRAALKYLAMMONIUM HALIDES AS FLOTATION COLLECTORS

David John Gannon, St-Bruno, Canada, assignor to Canadian Industries Limited, Montreal, Canada

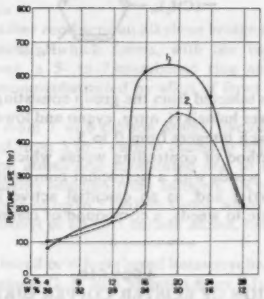
Filed Apr. 12, 1976, Ser. No. 675,763
Claims priority, application United Kingdom, July 28, 1975, 31540/75
Int. Cl.² B03D *1/02*; C22B *3/00*
U.S. Cl. 75—2 **12 Claims**

1. A process for the recovery of copper minerals from oxidized copper ores comprising the steps of
1. reducing an ore containing copper sulphide and oxidized copper minerals to a particle size suitable for froth flotation,
2. forming an aqueous pulp of said ore,
3. adding an alkali metal sulphide or an alkali metal hydrosulphide to said aqueous pulp to sulphidize oxidized minerals,
4. adjusting the pH of the sulphidized aqueous pulp to a value in the range 5 to 11,
5. adding a tetraalkylammonium halide and a water soluble fluoride to the aqueous pulp, and
6. subjecting said aqueous pulp to froth flotation and separating the resultant copper-bearing froth concentrate.

4,006,015
NI-CR-W ALLOYS

Rikizo Watanabe, and Yoshitaka Chiba, both of Yasugi, Japan, assignors to Hitachi Metals, Ltd., Japan

Filed July 29, 1975, Ser. No. 600,120
Int. Cl.² C22C *19/05*
U.S. Cl. 75—171 **26 Claims**



1. A Ni-Cr-W alloy, which consists essentially of, by weight, 0.001 – 0.1% carbon, 0.05 – 0.7% titanium, niobium or a mixture thereof, 18 – 25% chromium and 16 – 22% tungsten, the total content of chromium plus tungsten being from 36 to 44%, the balance being essentially nickel with incidental impurities.

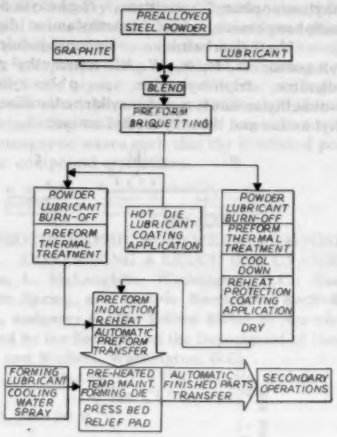
4,006,016
PRODUCTION OF HIGH DENSITY POWDERED METAL PARTS

John L. Zambrow, Deerfield; Rudolph M. Hempel, Palatine, and Louis T. Feng, Barrington, all of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed July 23, 1975, Ser. No. 598,442
Int. Cl.² B22F *3/14*; C22C *1/04*; B22F *3/16*
U.S. Cl. 75—221 **13 Claims**

1. A method of forming a powdered metal article having a high density in the order of 99% or greater of theoretical density, comprising the steps of: pressing a preform having a density in the range of 70 to 80% of theoretical density from a metal powder; heating the preform for approximately 20 to 30 minutes in a controlled atmosphere at a temperature in the

range of 2000° F to 2100° F to produce a treated preform having from 200 to 300 parts per million oxygen; heating the treated preform to a temperature of approximately 2100° F; rapidly transferring the heat-treated preform into a forming



die of a nickel-based alloy maintained at a temperature in the range of 1000° F to 1400° F; applying a forming pressure of 19.1 to 39 tons per square inch to the preform in the die for a contact time in the range of 0.05 seconds to 1.00 minute; and ejecting the article from the die and cooling.

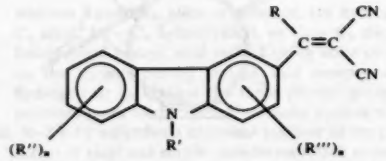
4,006,017
PHOTOCONDUCTIVE COMPOSITION, ARTICLE AND PROCESS

David J. Williams, Fairport; William W. Limburg, Penfield, and James M. Pearson, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 454,486, March 25, 1974, abandoned. This application Feb. 10, 1975, Ser. No. 548,453
Int. Cl.² G03G *5/04*
U.S. Cl. 96—1 R **15 Claims**

13. An electrostatographic imaging process comprising

a. providing an electrophotographic imaging member having a conductive substrate and a photoconductive insulating layer operatively disposed in relation thereto, said photoconductive insulating layer comprising a composition containing from about 0.1 to about 99.9 weight percent of at least one photogenerator compound of the formula



or

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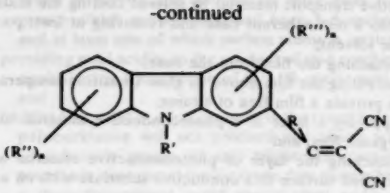


wherein R is hydrogen or nitrile; and R', R'', and R''' are independently selected from an aliphatic hydrocarbon radical having from about 1 to about 10 carbon atoms; phenyl; or substituted phenyl, said phenyl substituents being capable of releasing electrons to relatively electron deficient centers within the compound amino; diarylamino; dialkylamino or alkoxy; *n* can range from 0 up to the potential number of positions of substitution on the aromatic ring system

in an insulating polymeric matrix, the minimum concentration of photogenerator compound relative to polymeric matrix being sufficient to render the composition photoconductive; and

b. forming a latent electrostatic image on said member.

4,006,018
COPYING IN COLOR

Joseph A. Wiese, Jr., St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 728,167, May 10, 1968, abandoned. This application Sept. 10, 1975, Ser. No. 611,876
Int. Cl.² G03G *13/22*; **G03C** *7/16*
U.S. Cl. 96—1.2 **16 Claims**

1. A method for making a multicolor print from a multicolor original comprising:

a. holding said original and a print sheet in mutually optically fixed position;

b. inserting a photosensitive intermediate into the optical path between said original and said print sheet;

c. forming a pattern, corresponding to a first color separation of said original, on the photosensitive intermediate;

d. utilizing said pattern on said intermediate to form a first colored pattern on said print sheet without changing the relative position of said intermediate with respect to said print sheet;

e. repeating steps (b), (c) and (d) at least one more time to form at least a second colored pattern on said print sheet;

whereby said colored patterns are in registry on said print sheet.

4,006,019
METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTORECEPTOR

Ronald E. Karam, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 513,683, Oct. 10, 1974, abandoned. This application July 3, 1975, Ser. No. 592,839
Int. Cl.² G03G *5/04*
U.S. Cl. 96—1.5 **23 Claims**

1. An improved method for the preparation of an electrostatographic photoreceptor comprised of a layer of a polymeric active transport material which is capable of supporting the injection of photoexcited holes or transporting electrons from a photoconductive material and allowing the transport of such holes or electrons through the layer to selectively dissipate a surface charge thereon, said layer being from about 2 to 100 microns in thickness overcoating a layer of a photoconductive material 0.05 to 20 microns thick in operative connection with a conductive substrate which method consists essentially of:

a. preparing a free-standing film of an unoriented, organic,

active transport material by solvent coating the material onto a non-adherent base and removing at least part of the solvent;

b. detaching the film from the base;

c. annealing the film above its glass transition temperature to provide a film free of strains;

d. applying a layer of a photoconductive material to the organic film; and

e. attaching the layer of photoconductive material at its exposed surface to a conductive substrate with an adhesive material.

4,006,020

OVERCOATED ELECTROSTATOGRAPHIC PHOTORECEPTOR

John D. Polastri, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 476,024, June 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 474,296, May 29, 1974, abandoned. This application Mar. 13, 1975, Ser. No. 558,027

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **7 Claims**

1. An electrostatographic photoreceptor which comprises:

a. a conductive substrate;

b. a layer of an alloy of selenium and arsenic as photoconductive insulating material in operative contact with the conductive substrate; and

c. an organic overcoating on said photoconductive layer comprising a crosslinkable polymeric composition comprised of:

i. a first polymer which is the addition polymerization product of methyl methyacrylate, n-butylacrylate and acrylic or methacrylic acid; and

ii. a second polymer which is the addition polymerization product of styrene and maleic anhydride.

4,006,021

SENSITIZING A GRANULAR DISPERSION OF A COLOR GENERATOR AND AN ORGANIC HALOGEN COMPOUND BY HEAT

Hiroshi Yamashita; Nobuyoshi Sekikawa, and Hisatake Ono, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 245,401, April 19, 1972, abandoned. This application Apr. 14, 1975, Ser. No. 567,965

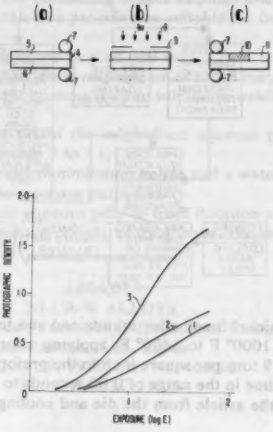
Claims priority, application Japan, Apr. 20, 1971, 46-24965; United Kingdom, Apr. 20, 1972, 18461/72; Germany, Apr. 20, 1972, 2219360; France, Apr. 20, 1972, 72.13971

Int. Cl.² G03C *5/24, 1/52*

U.S. Cl. 96—27 E **26 Claims**

1. A dry method for forming a colored image by a negative - positive working photographic procedure which comprises:

1. heating a dried recording material, which recording material comprises a support having thereon a color image - forming system comprising a dispersion of discret oblate spheroids of (a) an organic-halogen compound and (b) a separate color generator which is an organic compound containing a nitrogen atom, in a hydrophilic binder, said organic halogen compound generating halogen ions and-/or free radicals containing halogen on irradiation which react with said color generator, and said organic compound containing a nitrogen atom being selected from the group consisting of diphenylamine, n-hydroxydiphenylamine, N-ethyldiphenylamine, o-nitrodiphenylamine, N, N-dimethylaniline, N, N-diethylaniline, N, N, N′, N′-tetramethyl-p-phenylenediamine, N-phenyl-alpha-napthylamine, N-phenyl-beta-naphthylamine, N, N′-dimethyl-alpha-napthylamine, N, N′-dimethyl-beta-naphthylamine, dibenzylaniline, indole, N-vinylindole, 5-cyanoindole, 3-methylindole, triphenylamine, N, N′-diphenyl-p-phenylenediamine, benzidine, N, N′-diphenylbenzidine, 1, 2-dianilinoethylene 4,4′, 4″-methenyltris (N,N-demethylaniline, N-vinylcarbazole, p,P′-pentylidenebis(N, N-dimethylaniline), p,p′-triaminotriphenyl-carbinol, p,p′, p″-triamino-o-methyltriphenylmethane, aniline, carbazole, dibezylamine, N-phenyl-N-methylaniline, bis(p-dimethylaminophenyl) methane, N-phenylindole, o-aminodiphenylamine, p,p′-(dimethylamino)diphenylamine, N-ethylcarbazole, 3-phenyl-indole, p-phenylenediamine, N, N, N′, N′, tetramethyl-p-phenylene-diamine, triphenylamine, p, p′-benzylidene-bis (N,N-dimethylaniline), p,p′-benzylidenedianiline, dibenzylethyl amine and dibenzylmethyl amine;



2. thereafter imagewise exposing said recording material to radiation to form a visible color image of the reaction product of said color generator and the product(s) from said organic halogen compound;

the heating of Step (1) being at a temperature of from about 60+ C., to about 150° C., for a time sufficient to increase the density of said visible color image to about twice the density obtained with an otherwise identical recording material which has not been subjected to said heating.

4,006,022

RECORDING PROCESS UTILIZING SUPERCOOLED ORGANIC COMPOUNDS

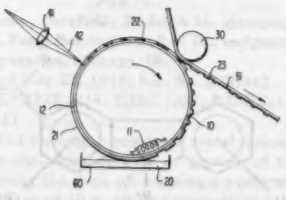
Shuichi Ohtsuka; Seiichi Taguchi, and Satoru Honjo, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 19, 1973, Ser. No. 417,323

Claims priority, application Japan, Nov. 18, 1972, 47-115843

Int. Cl.² G03C *5/24*

U.S. Cl. 96—48 R **15 Claims**



1. A recording process comprising heating a recording

material comprising a support having thereon a layer of at least one organic compound selected from the group consisting of benzothiazole, benzil, benzoin, vanillin, tribenzylamine, N-vinylcarbazole, benzophenone, diphenylamine, diaminodiphenylmethane, triphenylamine, benzoic anhydride, itaconic acid, diacetoneacrylamide, acrylamide, azoxybenzene, azobenzene, trans-stilbene, triphenylmethane, dihydroanthracene, benzamide, alpha-naphthol and o-phthaladehyde, said organic compound being capable of exhibiting a supercooled state until said organic compound melts; cooling said organic compound to a supercooled condition; and thereafter image wise irradiating said layer of said organic compound with electromagnetic waves such that the irradiated portion of the organic compound crystallizes.

4,006,023

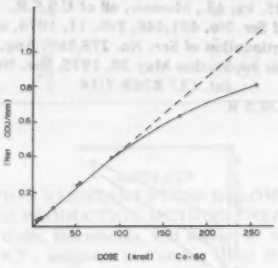
PHOTOGRAPHIC POLYMERIC COMPOSITION CONTAINING A LEUCO DYE CYANIDE

William L. McLaughlin, Washington, D.C.; Harry Levine, Silver Spring, and Marvin Rosenstein, Rockville, both of Md., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Oct. 7, 1974, Ser. No. 512,621

Int. Cl.² G03C 1/52

U.S. Cl. 96—90 R **26 Claims**



1. A process for the production of a photographic thermsetting radiation sensitive polymeric composition comprising the steps of combining:

i. 83–89.5% by weight of vinyl and/or acrylic monomers, which, when polymerized into a non-tacky solid polymer matrix, provide a host material for radiochromic triphenylmethane dye cyanides, which monomers are chosen to form a final solidified polymer which has a dielectric constant of greater than about 4;

ii. 1–15% by weight of a hydrophobic, leuco triphenylacetonitrile compound with at least one of the three phenyl groups having at the position para to the central methane carbon atom of a radical of the formula:

wherein R_1 and R_2, alike or different, are hydrogen, C_1 – C_4 alkyl, C_1 – C_4 hydroxyalkyl, or C_1 – C_3 alkylated or halogenated benzyl, said radical being alike or different on the various phenyl groups, said compound having hydrogen or methyl on the three phenyl groups at the positions meta to the central methane carbon atom, and

iii. ½–2% by weight of a chemical initiator of the polymerization of vinyl and acrylic monomers which is compatible with the triphenylacetonitrile compound used, said chemical initiator being an azo compound wherein the azo group is acrylic and bonded on both ends to carbon groups which are aliphatic and have 3–6 carbon atoms and at least one of which carbon atoms is tertiary;

providing mild acidity to the product of said combining step equivalent to the addition of 0.1–1% acetic acid thereto; and

heating in a mold at a temperature in the range below which polymerization will not proceed and above which the auxochromic groups of said triphenylacetontrile compound are dissociated in an oxygen-free atomsphere, until a three-dimensional, solid glassy vinyl and/or acrylic polymer having said leuco triphenylacetonitrile compound dispersed therein is formed.

4,006,024

PHOTOSENSITIVE COMPOSITIONS COMPRISING A POLYESTER-POLYETHER BLOCK POLYMER

Jyoji Ibata; Hidehiko Kobayashi; Kazuo Toyomoto; Kazuhiro Suzuoki; Yoshio Hayashi, and Masakazu Kurihara, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

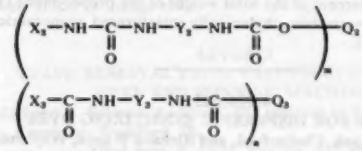
Division of Ser. No. 441,547, Feb. 11, 1974, Pat. No. 3,960,572. This application Feb. 3, 1976, Ser. No. 654,812

Claims priority, application Japan, Feb. 21, 1973, 48-21033; Apr. 21, 1973, 48-44646; May 21, 1973, 48-55510; Oct. 23, 1973, 48-118501

Int. Cl.² G03C 1/68

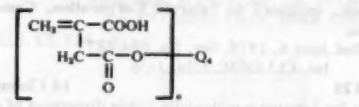
U.S. Cl. 96—115 R **15 Claims**

1. A photosensitive composition comprising (1) about 100 parts by weight of at least one prepolymer having a number average molecular weight of about 800 to 20,000 selected from the group consisting of



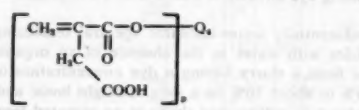
(II)

(III)



(IV)

and



(V)

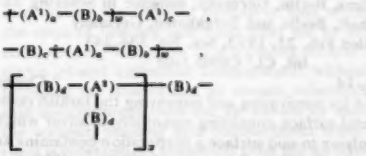
wherein

X_2 represents a residue of an amine having one or two ethylenically unsaturated bonds;

X_3 represents a residue of a carboxylic acid having one ethylenically unsaturated bond;

Y_2 and Y_3 represent a residue of a diisocyanate respectively;

Q_2, Q_3 and Q_4 each is a residue of a hydroxy terminated block polymer and is represented by the formula



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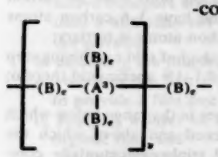


i. (A^1) represents a residue of a polyetherdiol having a number average molecular weight of about 200 to 5,000, (A^2) represents a residue of a polyethertriol having a number average molecular weight of about 500 to 5,000, (A^3) represents a residue of a polyethertetraol having a number average molecular weight of about 500 to 5,000, (B) represents a residue of a saturated polyesterdiol having a number average molecular weight of about 200 to 5,000,

iii. the weight ratio of the total weight of A^1 to B, A^2 to B, or A^3 to B is in the range of from about 1:4 to 4:1;

iv. *a* is an integer from 1 to 4; *b* is an integer from 1 to 4; *c* is an integer from 0 to 4; *d* is an integer from 1 to 3; *e* is an integer from 0 to 3; *e* is an integer from 0 to 4; *x* is an integer from 1 to 4; *y* is 1 or 2; $2 \leqq (a+b)w+c \leqq 20$, but *c* is not zero in the case of the prepolymer (IV) or (V); $2 \leqq d+x \leqq 5$, and when *e* is 1 or 2, *y* is 1 or 2; and when *e* is 3 or 4, *y* is 1; *m*, *n*, *o* and p each is an integer from 2 to 6, and *m*, *n*, *o* and *p is* 2 in the case of A^1; *k*, *m*, *n*, *o* and *p* each is an integer from 3 to 6 in the case of A^2; and *k*, *m*, *n*, *o* and *p* each is 4 or 6 in the case of A^3,

(2) 0 to about 120 parts by weight of at least one polymerizable ethylenically unsaturated monomeric compound; and (3) a photopolymerization initiator in an amount of about 0.001 to 10 weight percent of the total weight of the prepolymer (1) and the polymerizable ethylenically unsaturated monomeric compound (2).

4,006,025

PROCESS FOR DISPERSING SENSITIZING DYES

Thomas F. Swank, Chelmsford, and Richard Waack, Wayland, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed June 6, 1975, Ser. No. 584,487
Int. Cl.² G03C *1/24, 1/16*
U.S. Cl. 96—129 **14 Claims**

1. A process for forming a colloidally stable dispersion of a spectral sensitizing dye directly in water, which comprises the steps of:

a. mixing substantially water-insoluble spectral sensitizing dye particles with water in the absence of an organic solvent to form a slurry having a dye concentration of about 0.5% to about 30% on a weight/weight basis; and

b. homogenizing or milling said slurry at an elevated temperature of from about 40° C. to about 50° C. in the presence of a surfactant to provide finely divided dye particles having particle sizes in the range from about 0.5 to about 1.0 μ which are uniformly dispersed in said water.

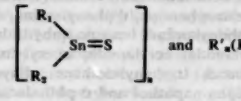
4,006,026

METHOD OF IMPROVING THE TARNISH RESISTANCE OF SILVER

Wolfgang Dahms, Berlin, Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Feb. 21, 1973, Ser. No. 334,243
Int. Cl.² C09D *5/08*
U.S. Cl. 106—14 **7 Claims**

1. A method for passivating and improving the tarnish resistance of a metal surface consisting essentially of silver which comprises applying to said surface a preparation containing an effective amount therefor of an active ingredient which is a compound of quadrivalent tin selected from the group consisting of a compound of the formula



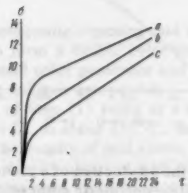
wherein R_1, R_2 and R′ are alkyl having 2 to 22 carbon atoms, R″ is alkyl having 4 to 22 carbon atoms or $-CH_2COOR_3$, where R_3 is alkyl having 1 to 22 carbon atoms, and *n* is 1, 2 or 3, distributed in a liquid carrier.

4,006,027

PROCESS FOR PRODUCING FOUNDRY MOUNDS AND CORES

Abram Moiseevich Lyass, Sharikopodshipnikovskaya ulitsa, 2, kv. 146; Pavel Afanasievich Borsuk, Nizhne-Pervomaiskaya ulitsa, 59, kv. 10; Zokhrab Gamid Ogly Usubov, B. Cherkizovskaya ulitsa, kvartal 8-11, korpus 21, kv. 106; Viktor Georgievich Kuznetsov, 5 Kozhukhovskaya ulitsa, 10, kv. 36; Naum Yakovlevich Kagan, 2 ulitsa Mariinoi roschi, 14v, kv. 22, all of Moscow; Jury Alexeevich Razumeev, Ulitsa Kolontsova, 7, kv. 6, Mytischi Moskovskoi oblasti; Vladimir Mironovich Bortnik, Eiskaya ulitsa, 9, kv. 26, Moscow; Isai Volfovich Korenbljum, Veernaya ulitsa, 3, korpus 4, kv. 112, Moscow, and Valentina Alexeevna Dmitrieva, ulitsa Trofimova, 25, kv. 43., Moscow, all of U.S.S.R.

Continuation of Ser. No. 441,446, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 278,869, Aug. 8, 1972, abandoned. This application May 28, 1975, Ser. No. 581,480
Int. Cl.² B28B *7/34*
U.S. Cl. 106—38.5 R **14 Claims**



1. A process for the production of foundry moulds and cores comprising the steps of preparing a mixture of moulding sand, an organic binder and a hardening agent, said hardening agent being of particulate material and comprising predominantly CaO and Al_2O_3 in a relative molar proportion of from 1.6:1 to 4:1 and containing from 40 to 98% by weight of tricalcium aluminate, shaping the resultant mixture and allowing it to harden in atmospheric air, said organic binder being selected from the group consisting of (A) lignosulfonates of an alkali or alkali-earth metal, an ammonium ion or mixtures thereof, (B) dextrin, and (C) an aqueous composition whose solids content consists essentially of substantially equal parts by weight of (a) levoglucosane and (b) calcium salts of hydroxy-acids, free hydroxy-acids and their lactones as calculated for α-oxy-γ-valerolactone, and (c) approximately 10% by weight of ethylene glycol and its acetic esters based on the total weight of (a) and (b).

4,006,028

SEALING GLASS COMPOSITIONS AND PASTES AND USE THEREOF

Neil B. Nofziger, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed July 3, 1975, Ser. No. 592,968
Int. Cl.² C03C *3/12, 3/10*
U.S. Cl. 106—47 R **27 Claims**

1. In a particulate glass composition comprising:

a. at least about 70 weight percent of a PbO-containing glass frit component having a sealing temperature of between about 350° to about 415° C., and

b. at least about 10–25 weight percent of at least one coarse particulate refractory filler component having a coefficient of thermal expansion of less than about 65×10^{-7} in./in./° C. (0°–300° C.) and a particle size distribution of about:

% of Particles	Microns
90	40–60
75	30–45
50	15–35
25	7–20
10	2–10
5	0.5–3

the improvement comprising:

c. at least about 0.25–10 weight percent of at least one fine particulate refractory filler component having a coefficient of thermal expansion of less than about 65×10^{-7} in./in./° C. (0°–300° C.) and a particle size distribution of about:

% of Particles	Microns
90	5–10
75	3–8
50	2–4
25	0.8–2.5
10	0.5–2.0
5	0.2–1.5

4,006,029
HYDRATION RESISTANT FUSED DOLOMITIC GRAIN AND PRODUCTION METHOD THEREFOR

Donald L. Gulle, Horseheads, and Robert K. Smith, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed June 17, 1974, Ser. No. 480,287

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C04B *35/04, 35/62*

U.S. Cl. 106—58 **20 Claims**

1. A basic, fused refractory material consisting essentially of, by weight on the oxide basis, 50–67% MgO and 33–50% CaO, and being characterized in at least a surface layer thereof by a fine microcrystalline structure having at least 2.0% MgO in solid solution in the CaO phase.

4,006,030
METHOD OF PREVENTING DETERIORATION OF INORGANIC SUBSTRATE SURFACE

Akitoshi Yoshida; Koichiro Yanagida, and Tadanobu Maruyama, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 415,357, Nov. 13, 1973, abandoned. This application July 8, 1975, Ser. No. 594,039

Claims priority, application Japan, Nov. 21, 1972, 47-117037

Int. Cl.² C04B *41/22*

U.S. Cl. 106—74 **7 Claims**

1. A method of preventing deterioration of an inorganic substrate surface which comprises coating or impregnating the surface thereof with a silicate solution or a silica sol having a particle diameter of 5-300 mμ and comprising a monovalent alkali metal component, an ammonium component and a silica component at a molar ratio of 1 : 1~10 : 4~5000 corresponding to M_2O: $[R_1R_2R_3R_4N]_2O$: SiO_2 wherein M is Li, K or Na; and R_1, R_2, R_3 and R_4 each represent a hydrocarbon group or an alkanol group and the silicate solution or the silica sol is prepared by passing a solution of an alkali silicate through a cation exchange resin.

4,006,031
CARBON BLACK PREPARATION FOR USE IN MINERAL BINDER

Horst Ferch, Bruchkobel, and Hans Wagner, Maintal, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed May 28, 1975, Ser. No. 581,474

Claims priority, application Germany, May 29, 1974, 2426266

Int. Cl.² C09C *1/56*

U.S. Cl. 106—307 **21 Claims**

1. A composition suitable for use in preparing a carbon black containing mineral binder of improved weathering stability consisting essentially of an aqueous carbon black mixture including 0.02 to 0.4% by weight of the carbon black of a fluorine containing wetting agent.

4,006,032
PROCESS FOR REMOVING OFF-FLAVOR FROM MAPLE SIRUP

Claude H. Hills, Flourtown, Pa., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 30, 1976, Ser. No. 653,794

Int. Cl.² C13D *3/14*

U.S. Cl. 127—46 A **16 Claims**

1. A process for removing off-flavor from maple sirup made from buddy sap and from maple sirup made from sap contaminated with buddy sap comprising passing the sirup through a bed of ion exchange resin.

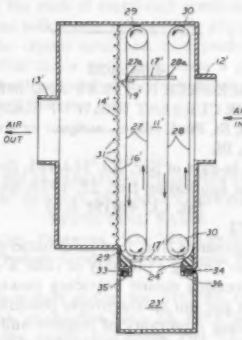
4,006,033
TRASH REMOVAL FROM VACUUM SYSTEM IN AN OPEN END SPINNING MACHINE

Richard A. Schewe, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed Sept. 8, 1975, Ser. No. 611,400

Int. Cl.² B01D *35/16;* **B08B** *1/00*

U.S. Cl. 134—6 **18 Claims**

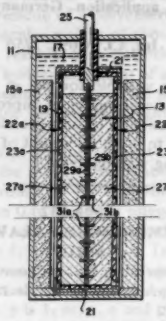


1. A method for removing trash from an air stream in the vacuum system of an open end spinning machine without interrupting the spinning operation, said method comprising the steps of filtering said trash from the air stream, scraping and sweeping said trash by a traveling scraper from the filter into a closed collection compartment without substantially impeding the flow of said air stream, substantially sealing-off said compartment from the air stream by means comprising the scraper, opening said compartment while the compartment is substantially sealed-off from the air stream, and cleaning said trash from the opened compartment.

4,006,034
METHOD OF PREPARING AN ELECTROCHEMICAL CELL IN UNCHARGED STATE

Hiroshi Shimotake, Hinsdale; Louis G. Bartholme, Joliet, and John D. Arntzen, Naperville, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 11, 1976, Ser. No. 665,746
Int. Cl.² H01M *4/36*
U.S. Cl. 29—623.1 **13 Claims**



1. A method of preparing a positive electrode for use in a secondary electrochemical cell opposite to a negative electrode containing an element for alloying with lithium comprising blending particulate lithium sulfide, transition metal and electrolytic salt of alkali metal halides or alkaline earth metal halides at a temperature below the melting point of the electrolytic salt to form a solid mixture; heating said solid mixture to a temperature in excess of the melting point of said electrolytic salt while simultaneously pressing said mixture onto an electrically conductive substrate to form a plaque; and assembling said plaque as a positive electrode within said electrochemical cell opposite to said negative electrode and electrically charging said cell to produce a transition metal sulfide in said positive electrode and a lithium alloy within said negative electrode.

4,006,035
MAINTENANCE-FREE BATTERY AND METHOD FOR REDUCING THE CURRENT DRAW OF SUCH BATTERIES

George W. Mao, St. Paul, Minn., assignor to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 514,023, Oct. 11, 1974, abandoned. This application Dec. 12, 1975, Ser. No. 640,192
Int. Cl.² H01M *4/36*
U.S. Cl. 429—72 **11 Claims**

1. In a maintenance-free lead-acid battery comprising a battery container having a plurality of cells, a cover sealed to the container, venting means providing passages for the escape of evolved gas and an electrolyte contained in the cells, each cell including a plurality of positive and negative electrodes disposed therein comprising a grid supporting structure having a layer of active material attached thereto, the improvement wherein said electrolyte contains an additive consisting of cadmium or a cadmium compound in an amount sufficient to decrease the gassing current during constant voltage overcharge of said maintenance-free battery, the amount of cadmium corresponding to that provided by from about 0.1 to about 0.5% cadmium sulfate, based upon the weight of the electrolyte, and at least the grid supporting structure for the negative electrode consisting of an alloy essentially free of antimony and capable of allowing the cadmium added to deposit on the negative electrode during charging in amounts sufficient to decrease the gassing current during constant voltage overcharge of the maintenance-free battery.

7. A method of reducing the gassing current during constant voltage overcharge in a maintenance-free battery comprising a battery container having a plurality of cells each including a plurality of positive and negative electrodes disposed therein comprising a grid supporting structure having a layer of active material attached thereto and an electrolyte contained in the cells which comprises adding an additive consisting of cadmium or a cadmium compound to said electrolyte in an amount sufficient to decrease the gassing current during constant voltage overcharge, the amount of cadmium corresponding to that provided by from about 0.1 to about 0.5% cadmium sulfate, based upon the weight of the electrolyte, and at least the grid supporting structure for the negative electrode consisting of an alloy essentially free of antimony and capable of allowing the cadmium added to deposit on the negative electrode during charging in amounts sufficient to decrease the gassing current during constant voltage overcharge of the maintenance-free battery.

4,006,036
METHOD FOR REDUCING ZINC OXIDE CONTENT OF ZINC PARTICLES

John C. Charkoudian, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 26, 1974, Ser. No. 536,433
Int. Cl.² H01M *4/38*
U.S. Cl. 427—123 **8 Claims**

1. The method for producing an anode assembly which comprises the steps, in sequence, of treating zinc particles with a solution of a zinc sequestering agent at a pH of about 7, washing the thus-treated zinc particles, mixing the zinc particles with a polymeric binder material, coating an electrically conductive substrate with the mixture, and drying the coating to form an adherent zinc coating on said substrate.

4,006,037
MINERAL FILLED, HIGH IMPACT, POLYOLEFIN MOLDING COMPOSITIONS

Michael R. Tirpak, Maywood; James J. Schouten, Glen Ellyn, and Charles E. Green, Brookfield, all of Ill., assignors to The Richardson Company, Des Plaines, Ill.

Filed Nov. 4, 1974, Ser. No. 520,881
Int. Cl.² H01M *2/02*
U.S. Cl. 429—176 **18 Claims**

1. A thermoplastic molding composition suitable for forming articles having high heat stability with high impact resistance at low temperature consisting essentially of a copolymer of propylene and ethylene, said copolymer containing a finely divided feldsparic anhydrous alumino silicate wherein the feldsparic alumino silicate has an oil absorptivity of from about 12 to 30 pounds of oil per hundred pounds of the feldsparic alumino silicate and a Mohs' hardness of from about 5.0 to about 6.5, the copolymer contains from 75 to 90 weight percent propylene and 10 to 25 weight percent ethylene and the feldsparic alumino silicate is present within the range of from about 10 to about 35 weight percent of the composition.

4,006,038

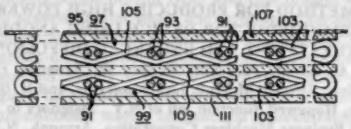
HEAT REFLECTING TAPE FOR THERMOELECTRIC CONVERTER

David L. Purdy, Indiana, Pa., assignor to ARCO Medical Products Company, Leechburg, Pa.

Division of Ser. No. 205,591, Dec. 7, 1971, Pat. No. 3,923,551, which is a division of Ser. No. 817,271, April 14, 1969, Pat. No. 3,649,367, which is a continuation of Ser. No. 554,874, June 2, 1966, abandoned. This application Nov. 13, 1975, Ser. No. 631,587

Int. Cl.² H01L *25/00*

U.S. Cl. 136—225 2 Claims



1. A tape for a thermoelectric converter including cloth composed of threads interlaced with thermoelectric wires, said tape also including a layer of heat-radiation reflecting material extending over said cloth insulated from said wires.

4,006,039

COMPONENT FOR THERMOELECTRIC GENERATOR

David L. Purdy, Indiana, Pa., assignor to ARCO Medical Products Company, Leechburg, Pa.

Division of Ser. No. 205,591, Dec. 7, 1971, Pat. No. 3,923,551, which is a division of Ser. No. 817,271, April 14, 1969, Pat. No. 3,649,367, which is a continuation of Ser. No. 554,874, June 2, 1966, abandoned. This application Nov. 13, 1975, Ser. No. 631,588

Int. Cl.² H01L *25/00*

U.S. Cl. 136—237 3 Claims

1. An electrical component for a thermoelectric converter including a tape formed of cloth composed of electrically insulating threads interlaced with a large number of thermoelectric wires having terminal ends, a ceramic insulator having, over limited areas thereof, each area corresponding to a terminal end, a coating of a first metal which adheres to said insulator, and an electrical thermoelectric junction including a second metal, which wets said first metal and adheres to said terminal ends but does not wet said insulator, the said junction including said first and second metals and said terminal ends.

4,006,040

SEMICONDUCTOR DEVICE MANUFACTURE

Harvey E. Cline; Thomas R. Anthony, both of Schenectady, and Mike F. Chang, Liverpool, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,672

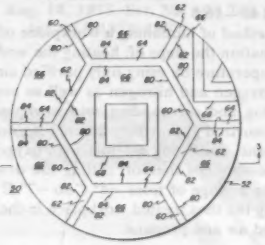
Int. Cl.² H01L *21/225*

U.S. Cl. 148—1.5 33 Claims

1. An improved method for migrating a melt of metal-rich semiconductor material through a solid body of the semiconductor material including the process steps of:

a. selecting a body of single crystal semiconductor material having two major opposed surfaces comprising the top and bottom surfaces thereof, a predetermined type conductivity, a predetermined level of resistivity, a preferred diamond cubic crystal structure, a preferred planar crystal orientation for at least one of the major surfaces, a vertical axis substantially perpendicular to the opposed major surfaces, and a first preferred crystal axis substantially parallel with the vertical axis and substantially perpendicular to the opposed major surfaces;

b. vapor depositing a layer of metal on the major surface having a preferred planar crystal orientation, the layer having a preferred width and a preferred thickness and so oriented as to form at least one metal wire having a longitudinal axis substantially aligned parallel with a second preferred crystal axis of the crystal structure of the material of the body;



c. heating the body and the layer of metal to an elevated temperature for a predetermined period of time sufficient to sinter at least a portion of the layer of metal to a portion of the semiconductor material of the major surface of the body;

d. heating the sintered body and the metal wire to a predetermined elevated temperature sufficient to form a melt of metal-rich semiconductor material on the surface of the body;

e. establishing a temperature gradient substantially parallel to the vertical axis of the body and the first axis of the crystal structure; and

f. migrating the melt of metal-rich semiconductor material through the solid body, substantially aligned with the first axis of the crystal structure, to a predetermined depth beneath that major surface to form a planar region of recrystallized material of the body having solid solubility of the metal therein.

4,006,041

ONE STEP FILM-FORMING PHOSPHATIZATION OF METALLIC SURFACES AND COMPOSITION FOR EFFECTING SAME

Juan Brugarolas Fabregas, 92, Via Layetana, Barcelona, Spain, and Frederic Gruber, 6 rue Auguste Thomas, Asniers, France

Continuation-in-part of Ser. No. 516,739, Oct. 21, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,430

Claims priority, application Spain, Oct. 22, 1973, 420039; May 10, 1974, 426388

Int. Cl.² B05D *7/14*, *3/02*; C23F *7/26*, *7/08*

U.S. Cl. 148—6.16 10 Claims

1. The method of forming a corrosion resistant coating on metals which provides, in addition, an adherent surface for paints, comprising forming a treatment solution by dissolving in an acid selected from the group consisting of phosphoric, boro-phosphoric and the acid esters of phosphoric at least one metal salt selected from the group consisting of the salts of zinc, manganese, iron and lead in an amount sufficient to provide a solution of primary phosphates of said metals, adding to the said solution containing said primary phosphates an

organic reducing agent, partially oxidizing the resultant composition through the addition of chromic acid or its salts in quantity sufficient to produce in said solution trivalent chromium ions, applying said treatment solution to the surface of a metal, said solution being in the pH range of from about 1 to 3, and thereafter drying the treated metal surface to form thereon a reticulated film strongly adherent to the base metal.

4,006,042

METHOD OF AND APPARATUS FOR HARDENING WORKPIECES OF STEEL

Wolfgang Kieferle, Ravensburg, Germany, assignor to Hawera Probst Kommanditgesellschaft Hartmetall-Werkzeugfabrik Ravensburgh, Ravensburg, Germany

Filed Mar. 17, 1975, Ser. No. 559,247

Claims priority, application Germany, Mar. 18, 1974, 2412982; Dec. 5, 1974, 2457605

Int. Cl.² C21D *1/48*

U.S. Cl. 148—16.5 **4 Claims**

1. A method of hardening a workpiece of steel, comprising in combination the steps of: heating the workpiece to austenitizing temperature by using only purified air consisting essentially of oxygen and nitrogen as well as compounds thereof, pressurizing and surrounding said workpiece by way of the same pressurized gas mixture comprising only the purified air and propane, consisting essentially of oxygen and nitrogen as well as compounds thereof, setting the dew point of the gas mixture to a range of from −4° C to −7° C and subsequently quenching the thus treated workpiece in the same gas mixture of purified air and propane.

4,006,043

METHOD OF MAINTAINING AT VERY LOW VALUES THE CONTENT OF CYANIDE IN SALT BATHS CONTAINING CYANATES

Antoine Gaucher, Saint-Etienne, and Gérard Guilhot, St-Jean Bonnefonds, both of France, assignors to Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement, Andrezieux-Boutheon, France

Filed May 13, 1975, Ser. No. 576,993

Claims priority, application France, May 17, 1974, 74.17195; Apr. 10, 1975, 75.11166

Int. Cl.² B23K *35/24*

U.S. Cl. 148—27 **8 Claims**

1. A method of maintaining at very low values the cyanide content in baths of molten salts in which the main active principle is the cyanate anion CNO^-, comprising conjointly providing in said bath sulphur in an amount between 0.001 and 0.1% by weight of said bath, introducing a substance containing at least one carbonyl group into said bath and maintaining said substance in said bath in a quantity such that, per kg. of bath and per 24 hours maintenance at working temperature, said substance has a weight of CO of between 1 and 25 grams, and maintaining the working temperature of said bath between 480° and 650° C.

4,006,044

STEEL SLAB CONTAINING SILICON FOR USE IN ELECTRICAL SHEET AND STRIP MANUFACTURED BY CONTINUOUS CASTING AND METHOD FOR MANUFACTURING THEREOF

Tatsuo Oya; Minoru Motoyoshi; Masfumi Okamoto; Kiyoshi Tanaka, and Takayasu Sugiyama, all of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 501,818, Aug. 29, 1974, abandoned, which is a continuation of Ser. No. 253,850, May 16, 1972, abandoned. This application Apr. 1, 1975, Ser. No. 563,980

Int. Cl.² C04B *35/00*

U.S. Cl. 148—31.55 **4 Claims**

1. A continuously cast and vacuum degassed steel strip for use as a cube-on-edge oriented electrical steel sheet and strip which possesses no blister in the final product, obtained by the process which comprises heating a slab consisting essentially of 2.5 to 4.0 wt.% silicon, less than 0.40% aluminum, less than 3 ppm hydrogen and less than $[Al(\%) \times 10^3 + 40]$ ppm of nitrogen, with the balance being iron at a temperature not lower than about 1,200° C, and then hot rolling the slab, cold rolling the strip with a reduction not less than about 40%, subjecting the strip to decarburization annealing, and then final annealing the strip at a temperature not less than about 1,100° C.

4,006,045

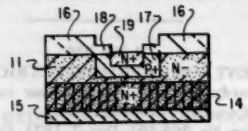
METHOD FOR PRODUCING HIGH POWER SEMICONDUCTOR DEVICE USING ANODIC TREATMENT AND ENHANCED DIFFUSION

Joseph A. Aboaf, Peekskill; Robert W. Broadie, Hopewell Junction; Edward M. Hull, La Grangeville, and H. Bernhard Pogge, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 516,064, Oct. 21, 1974, Pat. No. 3,961,353. This application Feb. 13, 1976, Ser. No. 657,869

Int. Cl.² H01L *21/22, 29/04*; B23P *1/00*

U.S. Cl. 148—187 **7 Claims**



1. In the method of producing a semiconductor device, the steps comprising:

providing a semiconductor substrate having a top and back surface;

forming a porous portion by anodic treatment within said substrate extending inwardly of said back surface;

forming a protective insulating layer on the top surface of said substrate;

doping said porous portion to a region o higher conductivity than said substrate;

forming a protective layer on the back surface of said substrate;

removing the top protective insulating layer from said substrate; and,

introducing impurities into the top surface of said substrate so as to form a semiconductor device.

4,006,046

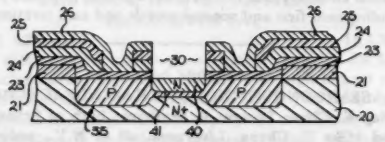
METHOD FOR COMPENSATING FOR EMITTER-PUSH EFFECT IN THE FABRICATION OF TRANSISTORS

Parekh C. Pravin, Winchester, Mass., assignor to TRW Inc., Los Angeles, Calif.

Filed Apr. 21, 1975, Ser. No. 570,036

Int. Cl.² H01L *21/225*

U.S. Cl. 148—187 **13 Claims**



1. A method for fabricating an electrical translating device comprising the steps of:

a. providing a semiconductor wafer of a first conductivity type;

b. disposing a first passivating layer on the surface of said semiconductor wafer;

c. forming an opening in said first passivating layer exposing a portion of the surface of said semiconductor wafer;
d. disposing a first dopant layer of a second conductivity type opposite to said first conductivity type at least within said opening;
e. disposing a second passivating nitride layer upon said first dopant layer;
f. forming an opening in said second passivating layer which is smaller than the opening in said first passivating layer exposing a portion of said first dopant layer;
g. removing a uniform portion of said exposed first dopant layer; and
h. diffusing a first dopant from said first dopant layer into said semiconductor wafer and forming a first and second concentration region of said first dopant, said first concentration region being beneath said second passivating layer and having a greater concentration of said first dopant than said second concentration region of said semiconductor wafer, said second concentration region being beneath said opening in said second passivating layer.

4,006,047

CATALYSTS FOR ELECTROLESS DEPOSITION OF METALS ON COMPARATIVELY LOW-TEMPERATURE POLYOLEFIN AND POLYESTER SUBSTRATES

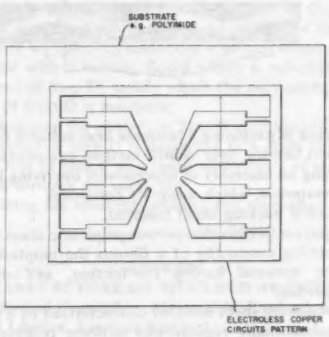
Charles Roscoe Brummett, Harrisburg; Ray Ned Shaak, Lebanon, and Daniel Marshall Andrews, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 490,817, July 22, 1974, Pat. No. 3,937,857. This application Nov. 8, 1974, Ser. No. 521,999

The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.

Int. Cl.² B05D *5/12, 3/04*

U.S. Cl. 156—656 **15 Claims**



1. A method for the deposition of a copper, nickel cobalt, or gold as metal onto an inert substrate for said metal said substrate being selected from the group consisting of polyester, polyamides, polyvinylchloride, polyethylene, polypropylene, copolymers of either polyolefin, and poly (1a) olefins in the homologous series of the polyethylene and polypropylene, from an electroless bath containing said metal, said method comprising the steps of:

degreasing said substrate;

applying to said substrate a thin film of a thermally decomposable complex of palladium or platinum having the formulae

LmPdXn, or

LmPtXn

wherein

L is a ligand or an unsaturated organic group; Pd or Pt is palladium or platinum metal; X is a halide, an alkyl group or a bidentate ligand; and *m* is from 1 to 4 and n is from 0 to 3

exposing said substrate to which said complex has been applied to heat at a temperature of less than a temperature at which the substrate loses its dimensional stability, to effect decomposition of said complex and to create a residue on said substrate catalytic to a copper, nickel, cobalt or gold metal in an electroless bath solution; and

depositing a copper, nickel, cobalt or gold metal from said electroless bath on said substrate in an area rendered catalytic by decomposition of said complex.

4,006,048

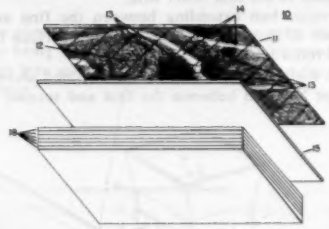
REVERSE PRINTED HIGH-PRESSURE LAMINATES

Daniel L. Cannady, Jr., Allendale, S.C., and Salvatore E. Palazzolo, Elizabeth City, N.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 14, 1975, Ser. No. 604,749

Int. Cl.² B32B *33/00*

U.S. Cl. 156—90 **10 Claims**



1. A method of making a heat and pressure consolidated decorative laminate comprising the steps of:

A. preparing a core layer comprising a plurality of fibrous sheets impregnated with a resinous material; and then

B. placing on top of the core at least one unfilled kraft paper barrier sheet impregnated with at least 30 weight percent of a resin selected from the group consisting of aminotriazine-aldehyde resin, urea-aldehyde resin, thiourea-aldehyde resin, mixtures thereof, and unsaturated polyester resin; and then

C. placing on top of the barrier sheet an unfilled, protective, fibrous overlay sheet selected from the group consisting of alpha cellulose and regenerated cellulose paper impregnated with a resin selected from the group consisting of aminotriazine-aldehyde resin, urea-aldehyde resin, thiourea-aldehyde resin, mixtures thereof, and unsaturated polyester resin; said protective sheet having a design printed on the surface facing the barrier sheet, said design having applied thereto a coating of pigmented material, said pigmented material, containing about 2 to 80 weight percent colored pigment dispersed in a carrier medium, and

D. heat and pressure consolidating the sheets into a unitary, bonded laminate; wherein the barrier sheet is effective to prevent core resin bleed through to the overlay sheet, and the pigmented material applied to coat the protective sheet design is effective to mask the color of the barrier and core sheets.

4,006,049

PIPE COATING APPARATUS

David L. Gardner, Rte. 11, Box 64, Conroe, Tex. 77301

Filed May 19, 1975, Ser. No. 578,890

Int. Cl.² B65H *81/00*

U.S. Cl. 156—195 **21 Claims**

1. A method of coating pipe comprising the steps of:

a. placing coating material of specified width on an endless conveyor;

b. compressively and adhesively applying said coating material in helical turns to a rotating pipe which is axially advanced adjacent said endless conveyor; said compressive application causing flow of one edge of said coating material against the last applied turn thereof, whereby said flow is permitted by confining said coating on the opposite edge thereof;

e. and after compressive application, temporarily supporting the face of said coating material in a region adjacent said opposite edge and over a width less than said specified width.

7. Apparatus for applying a coating of a weight material to the exterior of a pipe, comprising:

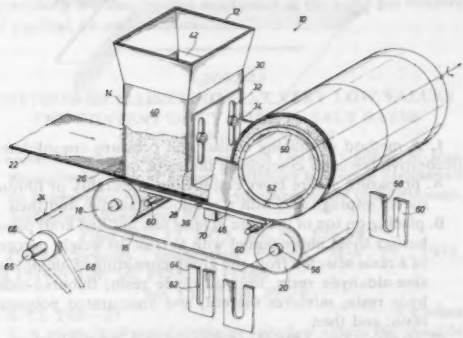
pipe handling means for advancing a pipe to be coated along the axis of the pipe and for rotating the pipe about the pipe axis as the pipe is advanced;

a first cylindrical roller positioned approximately below the axis of the pipe and adapted to rotate about a first roller axis spaced a predetermined distance from the exterior surface of the pipe;

a second cylindrical roller positioned laterally from the first roller and adapted to rotate about a second roller axis parallel to the first roller axis;

a conveyor belt extending between the first and second rollers adapted to advance its upper surface toward the first roller in endless fashion;

weight material dispensing means disposed above the conveyor belt and between the first and second rollers for



receiving a quantity of weight material and dispensing the weight material over the conveyor belt for application to the exterior surface of the pipe;

first guide means for guiding the weight material on the conveyor belt toward the pipe to wrap around the pipe in helical fashion and which defines a generally rectangular ribbon of weight material having first and second sides on the right and left of an outer face;

means for advancing the conveyor belt toward the pipe to carry the weight material for wrapping around the pipe where one side of the ribbon is placed adjacent to the previously applied helical turns of weight material on the pipe;

the first roller being positioned with respect to the pipe to compress the weight material onto the pipe and to apply the weight material thereover in helical fashion as the pipe is rotated and advanced;

a side defining means contacting the ribbon of weight material to shape and define the second side thereof which side is exposed after application to the pipe for contact against a subsequently applied helically positioned portion of the ribbon of coating material;

the second side and the adjacent outer face defining an edge between them and which second side and outer face come together at an approximately right angle; and

face defining means cooperatively arranged with the side defining means for shaping and defining the edge as the ribbon of weight material as applied to the pipe.

4,006,050

METHOD OF MANUFACTURING CARDS AND OTHER DOCUMENTS

Gerald Covington Hurst, Tadworth, and Kenneth Adams, South Croydon, both of England, assignors to George M. Whiley Limited, Ruislip, England

Filed Feb. 7, 1975, Ser. No. 548,138

Claims priority, application United Kingdom, Feb. 11, 1974, 6197/74

Int. Cl.² B44C *1/16*; B32B *31/20*

U.S. Cl. 156—234 **6 Claims**

1. A method of manufacturing a card or document, which comprises (a) forming by xerography a developed, transferable image of a security nature on a transfer sheet which sheet comprises a carrier sheet, a release layer adjacent to the carrier sheet and a lacquer layer on that side of the release layer remote from the carrier sheet, the formation of the image being on that side of the lacquer layer remote from the release sheet; and (b) causing the image on the transfer sheet to abut a base formed of a plastics material and causing the transference of at least the image and lacquer layer to the base by a combination of heat and pressure so that the material of the image and the base become fused together.

4,006,051

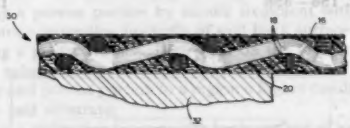
METHOD OF PREPARING A LOW-FRICTION LAMINATE LINER FOR BEARINGS

David A. Board, Jr., Laconia, N.H., assignor to New Hampshire Ball Bearings, Inc., Laconia, N.H.

Division of Ser. No. 444,340, Feb. 21, 1974, Pat. No. 3,950,599. This application July 11, 1975, Ser. No. 595,297

Int. Cl.² F16C *33/20*

U.S. Cl. 156—247 **19 Claims**



1. A method of preparing a laminate liner suitable for use as a low-friction bearing liner, which method comprises:

a. providing an assembly of successively overlying layers of sheet materials, which assembly comprises

i. a flexible backing sheet material,

ii. a separate flexible thin porous polymeric sheet material consisting essentially of a fibrous thermoplastic polymeric material having low-friction, self-lubricating properties,

iii. the backing sheet member characterized by a plurality of substantially regular and uniform relatively large openings therein,

iv. the polymeric sheet material characterized by a plurality of small pores therein, and

v. the assembly having a one exposed surface of the backing sheet member and another exposed surface of the polymeric sheet material;

b. applying a layer of a heat-hardenable resin binder material to the one exposed surface of the backing sheet member in an amount sufficient to fill in the openings of the backing sheet material;

c. placing the resin binder-filled assembly between opposing release surfaces;

d. compressing the assembly under heat and pressure conditions sufficient to force the resin binder material throughout the assembly and to force the porous fibrous polymeric sheet material into the openings of the backing sheet material to bond mechanically the polymeric sheet material to the backing sheet material; and

e. removing at least one release surface and recovering an

integral, thin, flexible, laminate liner suitable for use as a bearing liner and characterized by one resin-rich surface adapted to be secured to a supporting member, and another facing surface characterized by low-friction, self-lubricating properties.

4,006,052

DIFFUSION METHOD FOR DEPOSITING MICROPOROUS FILM

Wu Lan Wang, Newark, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Continuation of Ser. No. 223,538, Feb. 4, 1972, abandoned, which is a continuation of Ser. No. 780,988, Dec. 4, 1968, abandoned. This application Mar. 29, 1974, Ser. No. 456,352

Int. Cl.² B05D *3/10, 5/00*

U.S. Cl. 156—280 **9 Claims**

1. A method for forming a vapor permeable, breatheable, grain layer on the top surface of a porous natural leather replacement product substrate which comprises the steps of:

A. Coating a solution of a polyurethane elastomer in a solvent onto a release surface of a flexible sheet;

B. Wetting the said leather replacement product substrate with a wetting liquid which is miscible with the solvent of Step A, and in which the polyurethane elastomer of Step A is insoluble to produce a wetted substrate free from a surface film of wettting liquid on its top surface;

C. Laminating the product of Step A to the product of Step B so that the polyurethane solution of Step A is in contact with the top surface of the wetted substrate of Step B by bringing the said products into registry, passing through nip rolls, depositing the polyurethane elastomer as a base film on the top surface of the substrate by bathing the laminate in a separate bath of the wetting liquid, and removing said flexible sheet;

D. Applying a solution of a polyurethane elastomer in a solvent to the side of the base film carrying the deposited elastomer of Step C;

E. Bringing the uncoated bottom surface of the polyurethane elastomer solution coated substrate of Step D into registry with the top surface of a porous support which is wetted with a wetting liquid which is miscible with the solvent of Step D, and in which the polyurethane elastomer of Step D is insoluble;

F. Maintaining the contact of Step E until the polyurethane elastomer of Step D is deposited as a grain layer on the base film of Step C as a result of diffusion of said wetting liquid through the substrate;

G. Washing the resulting product and thereafter drying.

4,006,053

MANUFACTURE OF MOULDED ARTICLES

Anthony Gerald Goodfellow, Merseyside, England, assignor to Dunlop Limited, London, England

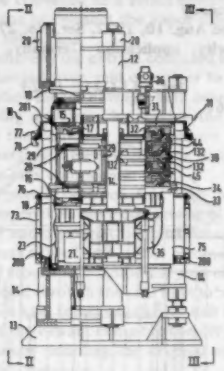
Filed Mar. 10, 1976, Ser. No. 665,429

Claims priority, application United Kingdom, Mar. 20, 1975, 11567/75

Int. Cl.³ B29H *3/10;* **B29G** *3/00*

U.S. Cl. 156—394 **7 Claims**

1. Apparatus for producing a moulded article from a plurality of components, the apparatus comprising a press having die members which are relatively movable as the press is opened and closed and a transfer unit assembly which is movable into and out of the press to and from an operative position between two of the die members of the press, the transfer unit assembly comprising relatively movable parts having at least one reservoir for mouldable material therebetween and having mould surfaces which, when the transfer unit is in its operative position, co-operate with mould surfaces of the die members to form mould cavities for the components and the arrangement being such that when the press is closed with the transfer unit assembly in its operative position the parts of the unit will be relatively moved by the press to cause the dimensions of the said at least one reservoir to be reduced so that mouldable material will be transferred into the mould cavities and the arrangement being such that thereafter the transfer



unit may be removed from the press and the press thereafter re-closed to bring the moulded components supported on the die members into assembled relation and to bond the components together.

4,006,054

METHOD OF MAKING FILTER TUBES

Brian Arthur Head, Chatham, England, assignor to Whatman Reeve Angel Limited, Maidstone, England

Division of Ser. No. 523,587, Nov. 14, 1974, Pat. No. 3,972,694. This application Nov. 12, 1975, Ser. No. 630,955

Int. Cl.² D21H *3/62, 5/18;* **D21J** *7/00*

U.S. Cl. 162—156 **16 Claims**

1. A method of preparing a glass-fiber filter tube, which method comprises:

a. impregnating a filter tube composed of a plurality of randomly disposed, nonwoven, glass fibers having a diameter of from about 0.001 to 10 microns with a volatile organic solvent solution of a hardenable silicone resin; and

b. heating the impregnated filter tube to a temperature sufficient to remove the volatile organic solvent and to crosslink and harden the silicone resin and to bond the crossover junctions of the glass fibers, thereby providing a porous, improved, self-supporting, filter tube.

11. A method of preparing an improved glass-fiber filter tube, which method comprises:

a. dispersing borosilicate glass fibers having a diameter from about 0.03 to about 8 microns in an aqueous solution;

b. forming the dispersed glass fibers about the surface of a porous mandrel to form a fibrous tube of the borosilicate glass fibers about the exterior surface of the mandrel;

c. drying the tube of borosilicate glass fibers to form a glass-fiber filter tube of the desired porosity;

d. immersing the dried filter tube into a volatile solvent solution containing a heat-hardenable silicone resin to impregnate the filter tube; and

e. heating the impregnated tube to a temperature to evaporate the solvent and to cross-link the silicone resin and to bond the glass fibers at the junctions of the fiber crossovers with from about 3 to 50% by weight of a hardened silicone resin.

4,006,055

RESILIENT TENSION DEVICE IN NUCLEAR REACTORS

Diethelm Knödler; Hans Kröpfl, and Alexander Steinke, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 10, 1972, Ser. No. 279,290

Claims priority, application Germany, Aug. 11, 1971, 2140170

Int. Cl.² G21C *19/28*

U.S. Cl. 176—61 3 Claims

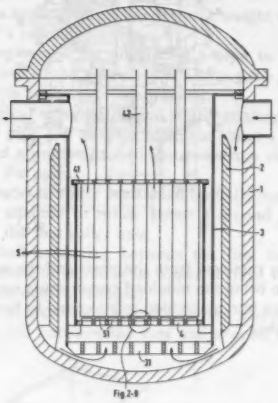


Fig 2-9

1. A nuclear reactor fuel element assembly including vertically interspaced upper and lower grid plates, at least one fuel element vertically positioned between said grid plates, and a system for guiding a coolant flow upwardly through said grid plates and said element, said grid plates forming grid openings and said element having upper and lower ends registered with said openings; wherein the improvement comprises said element's upper end abutting said upper grid plate and said element's lower end being spaced above said lower grid plate to define a space between said element's lower end and said lower grid plate, a frame structure having an upper level and disposed in said space and upwardly supported by said lower grid plate and having an open construction to permit said coolant to flow upwardly through said element's lower end, at least one upwardly acting spring positioned below the upper level of said frame structure and connected with the frame structure, means extending vertically slidably through said frame structure for transmitting the force of said spring upwardly to said fuel element's lower end; and means for pinning said element's lower end and said frame structure and said lower grid plate together, the second-named means holding said element's lower end and said frame in registration with said lower grid's opening and against relative rotative twisting and with said element's lower end free for vertical movement, said frame structure comprising upper and lower frame plates having central through openings for passing said coolant flow upwardly therethrough, and said spring being positioned between said frame plates, said lower frame plate being positioned in said lower grid plate's opening below the latter's upper level.

4,006,056

CONTROLLED RELEASE COMPOSITION CONTAINING STABILIZED UREASE

Meyer Michael Weber, Milwaukee, Wis., assignor to Midwest Biochemical Corporation, Milwaukee, Wis.

Filed Sept. 19, 1975, Ser. No. 614,920

Int. Cl.² C12B *1/00*

U.S. Cl. 195—2 14 Claims

1. A composition of matter comprising:

a. a solid, isotropic, controlled release agent,

b. stabilized urease, and

c. an accelerator, said accelerator being an enzyme selected from the group consisting of cellulase, hemi-cellulase, protease, and mixtures thereof.

4,006,057

METHOD OF PRODUCING L-CYSTEINE AND L-CYSTINE

Konosuke Sano, Machido; Keizo Matsuda, Kawasaki; Koji Mitsugi, Yokohama; Kazuhiko Yamada, Fujisawa; Fumihide Tamura, Kawasaki; Naohiko Yasuda, Yokosuka, and Ichiro Noda, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Nov. 4, 1975, Ser. No. 628,840

Claims priority, application Japan, Nov. 6, 1974, 49-127153; Dec. 3, 1974, 49-137697

Int. Cl.² C12D *13/06*

U.S. Cl. 195—29 17 Claims

1. A method for producing L-cysteine and/or L-cystine which comprises:

a. holding 2-amino-thiazoline-4-carboxylic acid in an aqueous solution at a pH of 5 to 11 in the presence of an effective amount of enzyme produced by a microorganism; said enzyme being capable of converting 2-amino-thiazoline-4-carboxylic acid to L-cysteine and/or L-cystine, and said microorganism being capable of growing in a medium containing 2-amino-thiazoline-4-carboxylic acid as a nitrogen source, and of producing said enzyme; and

b. recovering the L-cysteine and/or L-cystine formed from said aqueous solution.

4,006,058

BIOPOLYMER PRODUCTION PROCESS

Joseph George Savins, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,986

Int. Cl.² C12D *13/04*

U.S. Cl. 195—49 11 Claims

1. In a process for the production of a heteropolysaccharide by fermentation of a methanol containing culture medium with a microorganism of *Methylomonas mucosa* NRRL B-5696, the improvement comprising incorporating into said culture medium an alkali metal glycerophosphate as the predominant source of assimilable phosphate.

4,006,059

HYDROPHOBIC NONCOVALENT BINDING OF PROTEINS TO SUPPORT MATERIALS

Larry G. Butler, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Filed July 29, 1974, Ser. No. 492,508

Int. Cl.² C07G *7/02*

U.S. Cl. 195—68 5 Claims

1. A method of noncovalent binding of proteins to support materials, said method comprising:

selecting a hydrophilic support material having hydroxyl or amino groups;

treating said selected support material by chemically modifying said material by treatment with phenoxyacetyl chloride to make said support material hydrophobic in nature to thus form a hydrophobic derivative of said support material suitable for immobilizing proteins when exposed to said treated hydrophobic material;

selecting a protein that is capable of being immobilized on said treated hydrophobic material with said protein having a capacity for subsequent biological activity; and

exposing said selected protein to said treated hydrophobic material to cause said protein to be effectively immobilized on said treated hydrophobic material by adsorption and substantially without impairing said subsequent biological activity of the protein.

4,006,060

THIENAMYCIN PRODUCTION

Jean S. Kahan; Frederick M. Kahan, both of Rahway; Edward O. Stapley, Metuchen; Robert T. Goegelman, Linden, all of N.J., and Sebastian Hernandez, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 526,992, Nov. 25, 1974, Pat. No. 3,950,357. This application Nov. 18, 1975, Ser. No. 632,938
Int. Cl.[2] C12D 9/14
U.S. Cl. 195—80 R 2 Claims

1. A process for the production of the antibiotic thienamycin which comprises cultivating a thienamycin-producing strain of *Streptomyces cattleya* in an aqueous nutrient medium containing assimilable sources of carbohydrate, nitrogen and inorganic salts under submerged aerobic conditions and recovering the antibiotic so produced.

4,006,061

LACTATE DEHYDROGENASE DETERMINATION METHOD

Lloyd E. Weeks, St. Louis, and John H. Johnson, Kirkwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 29, 1975, Ser. No. 644,799
Int. Cl.[2] C12K 1/04
U.S. Cl. 195—103.5 R 7 Claims

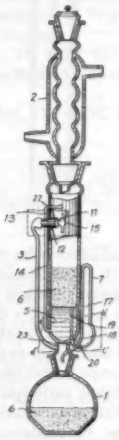
1. The method of determining lactate dehydrogenase activity in a biological fluid comprising reacting said biological fluid with an aqueous solution saturated with air or oxygen and containing lactate, NAD and an electron acceptor at a temperature of from about 25° to about 40° C and a pH of from about 8.8 to about 9.8 and measuring the uptake of oxygen by the oxidation of the resulting NADH with an oxygen-sensing electrode.

4,006,062

STILL EXTRACTOR WITH NOVEL STOPCOCK MEANS

Vishwa Mitra Bhuchar; Arun Kumar Agrawal; Franz Kiss; Jayanti Prasad Vasisht; Dharam Parkash, and Oudh Narain Lal Srivastava, all of Delhi, India, assignors to Council of Scientific and Industrial Research, New Delhi, India

Filed Jan. 9, 1975, Ser. No. 539,845
Int. Cl.[2] B01D 3/34, 11/04
U.S. Cl. 202—169 7 Claims



1. A solvent extractor comprising a distillation flask, an extraction unit connected to said distillation flask and a condenser, said extraction unit comprising:

a container for holding a substance for treatment with a solvent,

a vapor inlet tube through which the vapor of a solvent may be introduced into said container,

vapor outlet tubes fitted on the said container so that said vapor may be conveyed to a reflux condenser,

connecting means to connect the vapor-inlet tube and the vapor outlet tubes, and

siphon means whereby the extract collected in the container may be discharged from said container to the distillation flask, said siphon means having a bent tube formed of two legs comprising a shorter leg having the outlet for the extract from the container and a longer leg having the extract discharging extremity into the distillation flask;

said connecting means comprising:

a three-way stopcock between said inlet and said outlet tubes, said stopcock further comprising a plug having an inlet channel and an outlet channel arranged such that the longitudinal axis of said outlet channel is normal to, but displaced from the longitudinal axis of said plug,

the vapor conveyed through the said inlet tube being distributable between said reflux condenser and said container;

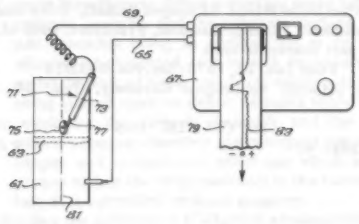
the siphoning of the extract being broken off by closing said stopcock, thereby enabling the original substance to be retained in the container.

4,006,063

METHOD FOR MEASURING SURFACE CHARACTERISTICS OF METALS AND METALLOIDS

Minas Ensanian, P.O. Box 98, Eldred, Pa. 16731

Continuation of Ser. No. 79,033, Oct. 8, 1970, abandoned. This application May 5, 1975, Ser. No. 574,360
Int. Cl.[2] G01N 27/46
U.S. Cl. 204—1 T 12 Claims



1. A process for detecting chemical and physical irregularities in a material of the class consisting of metals and metalloids which comprises providing a probe, said probe comprising an axle, an electrode of a material of said class, and a rollable, self-supporting, non-metallic body, containing an electrolyte, carried by and rotatable with said electrode about said axle, and continuously recording the voltage, and the polarity of said voltage, generated between said electrode and the surface of a test piece of a material of said class while establishing and maintaining substantially line contact between said body and said surface by rolling said electrode and body along a path on said surface while maintaining said electrode in electrical contact with said surface through said electrolyte.

4,006,064
PROCESS FOR THE ELECTRODEPOSITION OF CHROME PLATE USING FLUORINE-CONTAINING WETTING AGENTS

Hans Niederprüm, Monheim; Heinz Günter Klein, Cologne, and Johann Nikolaus Meussdoerffer, Blecher, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 10, 1976, Ser. No. 657,014

Claims priority, application Germany, Feb. 28, 1975, 2508708

Int. Cl.² C25D *3/10*

U.S. Cl. 204—51 **10 Claims**

8. An electrolyte solution for the electrodeposition of chrome layers comprising water, a hexavalent chromium compound and a quaternary ammonium perfluoralkane sulfonate as a surfactant.

4,006,065
PROCESS FOR THE SYNTHESIS OF PURE ISOMERS OF LONG CHAIN ALKENES

Otto Meresz, 8 Wallingford Road, and Cecilia Mozsgai, 10 Sunny Glenway, No. 103, both of Don Mills, Ontario, Canada

Division of Ser. No. 368,960, June 11, 1973, Pat. No. 3,932,616. This application Sept. 22, 1975, Ser. No. 615,740

Claims priority, application United Kingdom, June 26, 1972, 29835/72

Int. Cl.² C25B *3/00, 3/10*; C07C *11/00*

U.S. Cl. 204—59 R **7 Claims**

1. A process for preparing long chain olefinic compounds which includes electrolysing in the liquid phase a mixture comprising a short chain carboxylic acid and a longer chain carboxylic acid, at least one of which acids has unsaturation, in solution in organic solvent which comprises a mixture of a first organic solvent capable of maintaining carboxylate ions in solution and thus becoming conducting, and a second organic solution which is nonconducting, and recovering the long chain olefinic compounds so formed

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4,006,066
METHOD OF AND APPARATUS FOR THE TREATMENT OF EXHAUST-GASES IN THE ELECTROLYTIC PRODUCTION OF ALUMINUM

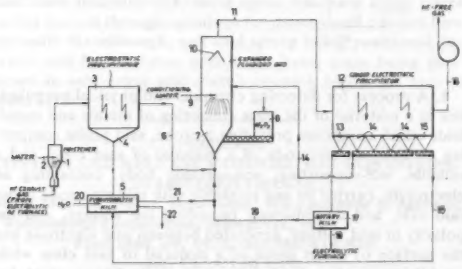
Volker Sparwald, Grevenbroich, Germany, assignor to Vereinigte Aluminum-Werke Aktiengesellschaft, Bonn and Metallgesellschaft Aktiengesellschaft, Frankfurt, both of, Germany, part interest to each

Filed Jan. 22, 1975, Ser. No. 542,931

Claims priority, application Germany, Jan. 24, 1974, 2403282

Int. Cl.² C25C *3/06*

U.S. Cl. 204—67 **8 Claims**



1. A method of removing hydrogen fluoride from an exhaust gas produced by a plant for the electrolytic production of aluminum, said gas containing impurities detrimental to the aluminue, said method comprises the steps of:

a. electrostatically precipitating said impurities from said gas;

b. thereafter passing said gas from which the impurities have been electrostatically precipitated in step (a) through an expanded fluorized bed of alumina particles to adsorb hydrogen fluoride from said gas on said alumina particles;

c. entraining the alumina particles on which hydrogen fluoride is adsorbed from said gas from the top of said expanded bed in a gas-solid suspension;

d. separating solids from said suspension by electrostatically precipitation immediately upon passage of said suspension from said bed, thereby grading said solid into a coarse-grain fraction, a medium-grain fraction and a fine-grain fraction, said fractions being separately collected;

e. heating said coarse-grain fraction and thereafter feeding the heated coarse-grain fraction to a furnace for the electrolytic production of aluminum; and

f. subjecting said fine-grain fraction to pyrohydrolysis to evolve hydrogen fluoride therefrom.

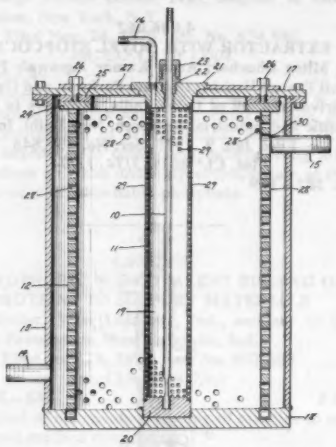
4,006,067
OXIDATION-REDUCTION PROCESS

Mark C. Gussack, 1 Overlook Ave., Great Neck, N.Y. 11021

Filed Mar. 5, 1973, Ser. No. 338,343

Int. Cl.² C25C *1/10*

U.S. Cl. 204—151 **5 Claims**



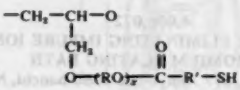
1. In an electrochemical process for oxidizing chromium in the +3 oxidation state to the +6 oxidation state comprising the steps of: providing an electrochemical cell having an anode compartment containing an anode, a cathode compartment containing a cathode and a semipermeable membrane capable of preventing passage of chromium in the +3 oxidation state separating said anode compartment from said cathode compartment; providing an acidic catholyte solution in said cathode compartment, said catholyte solution being substantially free of chromium in the +3 oxidation state; providing an anolyte solution in the anode compartment, said anolyte solution containing chromium in the +3 oxidation state; and passing a current between said anode and said cathode; the improvement wherein said anolyte solution is passed through and fills a multiplicity of pores provided in said anode while current is passed between said anode and cathode.

4,006,068
POLYMERCAPTOESTERS OF POLYGLYCIDOLS

Violete L. Stevens, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 30, 1975, Ser. No. 573,225
Int. Cl.² C08F 283/14
U.S. Cl. 204—159.11 21 Claims

1. A condensation polymer comprising at least one unit represented by the formula



(I)

wherein R is independently in each unit the residue of a ring-opened alkylene oxide moiety; R′ is independently in each unit a divalent C_1-C_{20} hydrocarbon residue of a mercaptocarboxylic acid; and x is independently in each unit zero or a positive integer up to about 100, provided that when said condensation polymer comprises only one unit represented by formula (I) it additionally comprises at least two units of a ring-opened alkylene oxide and x is zero.

4,006,069
SUPPORT FOR ELECTROPHORETIC ANALYSIS

Nobuo Hiratsuka, and Nakatsugu Yaginuma, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

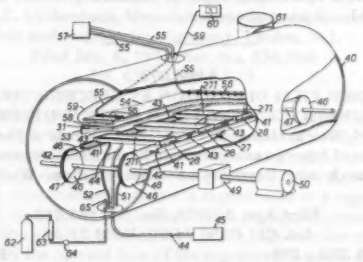
Filed Nov. 17, 1975, Ser. No. 632,884
Claims priority, application Japan, Nov. 15, 1974, 49-131828
Int. Cl.² G01N 27/26, 27/28
U.S. Cl. 204—180 G 15 Claims

1. In an electrophoretic analysis process utilizing a supported analysis member, the improvement wherein said supported analysis member comprises a porous polymeric flat plate and a polymeric gel enclosed in the open cells of the flat plate.

4,006,070
METAL OXIDE FILMS

Robert David King, Solihull, and Robert Hiscutt, Birmingham, both of England, assignors to Triplex Safety Glass Company Limited, London, England

Filed Jan. 26, 1972, Ser. No. 220,899
Claims priority, application United Kingdom, Feb. 5, 1971, 4234/71
Int. Cl.² C23C 15/00
U.S. Cl. 204—192 48 Claims



1. A method of depositing a transparent, electrically conducting, metal oxide film onto the surface of a substrate of extended lateral dimensions, said method comprising the steps of:

a. arranging a cathode assembly whose overall lateral dimensions are not substantially less than those of the substrate in the vicinity of the substrate but spaced apart therefrom to define a working space between the cathode assembly and the substrate surface, the cathode assembly being so constructed as to present a plurality of elongated, side-by-side strips comprising a metal capable of being reactively sputtered, said strips being spaced apart to define passages therebetween:

b. enclosing the cathode assembly and the substrate within a vacuum chamber containing an atmosphere of oxygen and at least one other gas which is inert to oxygen and to the other materials in the vacuum chamber, at a controlled reduced pressure;

e. heating the substrate to a selected, elevated temperature prior to a reactive sputtering step to be recited;

d. maintaining a substantial degree of uniformity in the oxygen concentration in said working space by allowing said atmosphere to penetrate through the spaces between said spaced strips and into said working space;

e. applying a high negative potential to the cathode assembly to effect deposition of said metal oxide film by reactive sputtering substantially perpendicularly from said strips on to the substrate; and

f. maintaining the substrate at the selected, elevated temperature during the sputtering step;

g. causing relative translatory movement between the cathode assembly and the substrate in a direction transverse to the length of said strips, through an amplitude substantially smaller than the overall length of the cathode assembly, but sufficient to cause all parts of the substrate surface to be coated by sputtering from at least one of said strips during the deposition process.

45. An article having its smallest lateral dimension greater than 30 cm. and having a stable transparent electrically conductive film deposited on a surface thereof, said film:

a. having a specific electrical resistivity of between 2×10^{-4} ohm cm. and 20×10^{-4} ohm cm., which resistivity is substantially uniform over the whole of said film;

b. having a thickness which is everywhere less than 10,000A;

c. having a light transmission figure of over 70%; and

d. having been deposited by a reactive sputtering method comprising the steps of:

i. arranging a cathode assembly whose overal lateral dimensions are not substantially less than those of the substrate in the vicinity of the substrate but spaced apart therefrom to define a working space between the cathode assembly and the substrate surface, the cathode assembly being so constructed as to present a plurality of elongated, side-by-side strips comprising a metal capable of being reactively sputtered, said strips being spaced apart to define passages therebetween;

ii. enclosing the cathode assembly and the substrate within a vacuum chamber containing an atmosphere of oxygen and at least one other gas which is inert to oxygen and to the other materials in the vacuum chamber, at a controlled reduced pressure;

iii. heating the substrate to a selected, elevated temperature prior to sputtering;

iv. maintaining a substantial degree of uniformity in the oxygen concentration in said working space by allowing said atmosphere to penetrate through the spaces between said spaced strips into said working space;

v. maintaining the substrate at the selected, elevated temperature during sputtering;

vi. applying a high negative potential to said cathode assembly to effect deposition of said metal oxide film by reactive sputtering substantially perpendicularly from said strips onto the substrate;

vii. selecting the value of the oxygen concentration, substrate temperature, vacuum chamber pressure, and cathode potential such that the deposited coating is haze-free and its specific electrical resistivity lies at or

close to the minimum of the curve which is obtained by plotting specific electrical resistivity against oxygen concentration while maintaining the substrate temperature, vacuum chamber pressure, and cathode potential all constant at selected values and

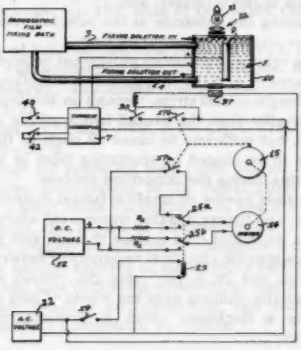
e. causing relative translatory movement between said cathode assembly and the substrate in a direction transverse to the length of said strips, through an amplitude substantially smaller than the overall length of the cathode assembly, but sufficient to cause all parts of the substrate surface to be coated by sputtering from at least one of said strips during the deposition process.

4,006,071

ACCUMULATOR PROGRAM FOR ELECTROPLATING ENERGY

Earl J. Martchenke, 3405 Sinton Road, Colorado Springs, Colo. 80907

Filed May 19, 1975, Ser. No. 578,381
Int. Cl.² C25C *1/22*; C25D *3/46*
U.S. Cl. 204—228 **1 Claim**



1. A time accumulator control for electrolytic process comprising:

a current generator;

electrolytic plating means including:

a cathode forming tank,

an anode disposed within said tank, said anode and cathode being electrically connected to the current generator;

power means,

means including first switch means interconnecting the power means and the current generator;

time multiplying means operatively connected to the switch means and responsive to a first input signal of given time duration, which time multiplying means includes:

a reversible motor having clockwise and counterclockwise input terminals;

a voltage source;

voltage control means interconnecting the said voltage source and the motor, and

a second switch means operatively connected to the voltage control means for applying a first voltage to the clockwise terminal of the motor and a second voltage to the counter-clockwise terminal of the motor;

a first input signal of given time duration comprising:

a voltage source,

control means operatively connected to the voltage source, and

means interconnecting the voltage source to the second switch means for operation thereof;

third switch means operatively connected to the current generator for controlling the operation thereof,

color sensing means, including a light source disposed and positioned so as to direct a beam of light through the said tank,

photoelectric switching means disposed to receive the said light and operatively connected to the third switching means for controlling the operation thereof, and

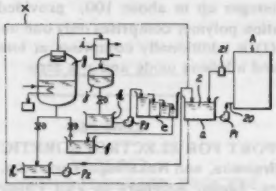
fourth switch means operatively connected to the current generator for controlling the current produced thereby, said switch means being responsive to a second input signal of given time duration.

4,006,072

DEVICE FOR ELIMINATING IMPURE IONS IN CHROMIUM PLATING BATH

Kiyoteru Takayasu, 617 Nimyo-cho 1980-banchi, Nara, Nara, Japan

Filed June 2, 1975, Ser. No. 583,039
Int. Cl.² C25C *1/10*; C25D *3/04*
U.S. Cl. 204—238 **17 Claims**



1. A device for removing metal ion impurities from chromium plating baths without depletion of chromate ions comprising

1. an electrolytic tank operable to hold plating bath;

2. at least one cathode disposed within said tank for immersion in plating bath held therein;

3. a plurality of anodes disposed within said tank for immersion in plating bath held therein and spaced from said cathode, said anode (a) being a hollow member, the lower, immersible end portion of which is closed, said member being composed of a corrosion resistant base material selected from the group consisting of (i) titanium, zinc, niobium and tantalum and (ii) alloys of titanium, zinc, niobium, tantalum and nickel, (b) having an outer active layer over and in electrical contact with at least the lower closed end portion of said member, said layer being a material selected from the group consisting of (i) platinum, palladium, ruthenium, rhodium, iridium and osmium and (ii) alloys of platinum, palladium, ruthenium, rhodium, iridium and osmium, and (c) having magnetic means disposed within said hollow member operable to impart a magnetic field around said anode; and

4. means operable to apply an electrical potential between said cathode and anodes.

4,006,073

THIN FILM DEPOSITION BY ELECTRIC AND MAGNETIC CROSSED-FIELD DIODE SPUTTERING

Kimo M. Welch, Mountain View, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 3, 1975, Ser. No. 565,019
Int. Cl.² C23C *15/00*; H01J *25/00*
U.S. Cl. 204—298 **5 Claims**

1. Apparatus for applying a thin film coating to a workpiece, comprising:

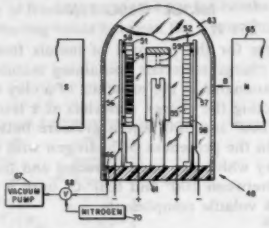
a cathode comprised of sputtering material;

a holder for mounting the workpiece opposite said cathode;

a plurality of anodes between said holder and said cathode, said plurality of anodes each being comprised of a wall

defining a central passage, said anodes being grouped together with the central passages of said anodes being parallel with one end of the passages opening towards said cathode and the opposite end opening towards said workpiece holder;

means for supplying an ionizable gas around said cathode, anodes, and workpiece holder;



means for establishing an electric field between said cathode and anodes sufficient to sustain an electrical discharge therebetween through said gas; and

means for establishing a magnetic field to extend throughout the space around said anodes and cathode.

4,006,074

REFORMING WITH A PLATINUM-ALUMINA CATALYST

Henry Erickson, Park Forest, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 286,993, Sept. 7, 1972. This application Dec. 22, 1975, Ser. No. 642,947

Int. Cl.² C10G *35/08*

U.S. Cl. 208—138 **9 Claims**

1. In a method for reforming a hydrocarbon feedstock comprising paraffins and naphthenes in at least one reaction zone with a catalyst comprising a catalytically effective amount of at least one platinum group metal component and alumina in the presence of free molecular hydrogen at hydrocarbon conversion conditions, the improvement which comprises using as the alumina a composition comprising macrosize particles containing a mixture of two distinct phases, said phases being (1) calcined discrete entities comprising first alumina, a major portion of said entities having a minimum dimension greater than about 50 microns and a maximum dimension of less than 200 microns and (2) a phase comprising calcined second alumina wherein the weight ratio of (1) to (2) is within the range from about 0.05:1 to about 2:1 and said second alumina is first calcined after the formation of macrosize particles.

4,006,075

METHOD OF REGENERATING A CRACKING CATALYST WITH SUBSTANTIALLY COMPLETE COMBUSTION OF CARBON MONOXIDE

Edward C. Luckenbach, Mountainside, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Jan. 6, 1975, Ser. No. 538,738

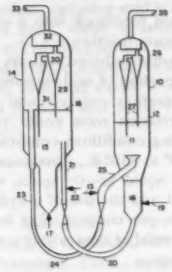
Int. Cl.² C10G *11/18*

U.S. Cl. 208—164 **21 Claims**

1. In a fluidized catalytic cracking process comprising contacting a hydrocarbon feedstock with cracking catalyst in a reaction zone under cracking conditions to produce cracked hydrocarbon vapors and coke contaminated catalyst, wherein said coke contaminated catalyst is regenerated in a regeneration zone at elevated temperature with an oxygen-containing regeneration gas, wherein catalyst in the regeneration zone is fluidized by the upward flow of the regeneration gas to form a dense phase catalyst bed and a dilute catalyst phase, the improvement for regenerating coke contaminated catalyst which comprises the following steps all of which are accomplished at a substantially constant regeneration gas rate:

1. increasing the temperature of the dense phase catalyst bed to a level ranging from about 1250° to about 1400° F. while maintaining the amount of coke produced in said reaction zone substantially constant so as to increase the rate of conversion of coke to carbon monoxide and carbon dioxide;

2. reducing the coke make in the reaction zone while maintaining the temperature of the dense phase bed substantially that of step (1) for a time sufficient to effect an increased oxygen concentration in the regeneration zone to burn at least an additional portion of coke from the coke contaminated catalyst to obtain in the regeneration zone a regenerated catalyst having a residual carbon content of less than about 0.2 wt. % and a substantially



catalyst-free flue gas containing less than about 0.2 vol. % of carbon monoxide; and

3. reducing the temperature of the dense phase catalyst bed to a level ranging from about 20° to about 100° F below that employed in steps (1) and (2) in order to maintain at least the level of residual carbon on regenerated catalyst obtained in step (2) and the content of carbon monoxide in the substantially catalyst-free flue gas at no greater level than that obtained in step (2), steps (1), (2) and (3) being effected while maintaining the temperature of the dilute catalyst phase at least that of the dense phase catalyst bed and within the range of from about 1250° to about 1450° F so as to avoid excessive afterburning in that portion of the regeneration zone wherein the flue gas is substantially catalyst-free.

4,006,076

PROCESS FOR THE PRODUCTION OF LOW-SULFUR-CONTENT HYDROCARBON MIXTURES

Robert I. Christensen, San Rafael, and George D. Gould, Orinda, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 355,230, April 27, 1973, Pat. No. 3,902,991. This application June 2, 1975, Ser. No. 583,139

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.² C10G *23/02*, *34/00*

U.S. Cl. 208—211 **26 Claims**

1. A process for producing a low-sulfur hydrocarbon mixture by desulfurizing a hydrocarbon feedstock, said feedstock being a reduced-crude obtained from a whole crude oil having a sulfur content of at least about 1 weight percent, which comprises:

1. separating said feedstock into a vacuum gas oil fraction and a vacuum residuum fraction;

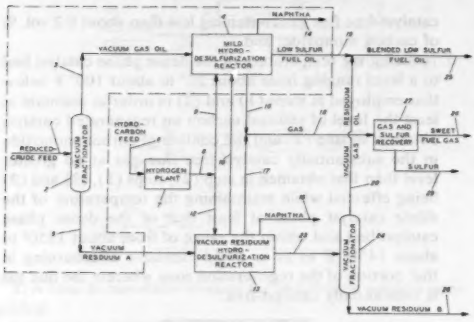
2. contacting at least a portion of said vacuum gas oil with a first hydrodesulfurization catalyst and hydrogen gas in a first hydrodesulfurization zone under a hydrogen partial pressure in the range 300 to 800 psig and a temperature in the range 550 to 850° F., said catalyst comprising a sulfided composite of a Group VIII metal, a Group VIA metal, phosphorus and a catalyst base comprising alumina, said catalyst having a pore volume in the range from 0.3 to 1 cc per gram, the pores of said catalyst

having a diameter in the range 0 to about 3000 Angstroms and an average pore diameter in the range 80 to 150 Angstroms, the pores of 80 to 150 Angstrom diameter contributing at least 70 volume percent of said pore volume;

3. withdrawing from said first hydrodesulfurization zone said low-sulfur hydrocarbon mixture, the 350° F.+ portion thereof having a sulfur content below 0.2 weight percent, calculated as elemental sulfur.

10. A process for producing a low-sulfur hydrocarbon mixture by desulfurizing a hydrocarbon feedstock, said feedstock being a reduced-crude obtained from a whole crude having a sulfur content of at least about 1 weight percent, which comprises:

1. separating said feedstock into a vacuum gas oil and a vacuum residuum fraction;
2. producing a sulfur-reduced vacuum residuum by contacting at least a portion of said vacuum residuum with a first hydrodesulfurization catalyst and hydrogen in a first hydrodesulfurization zone under vacuum residuum hydrodesulfurizing conditions comprising a temperature in the range 600° to 850° F., a pressure in the range 1000 to 2500 psig, a liquid hourly space velocity in the range below about 1 and the use of a hydrogen-containing gas having a hydrogen content of at least about 75 volume percent, said catalyst comprising a sulfided composite of



a Group VIII metal, a Group VIA metal and a catalyst base comprising alumina, said catalyst having a pore volume in the range from 0.3 to 1 cc per gram, the pores of said catalyst having a diameter in the range 0 to about 3000 Angstroms and an average pore diameter in the range 80 to 150 Angstroms, the 80 to 150 Angstrom diameter pores of said catalyst contributing at least 70 volume percent of said pore and wherein an amount in the range from about 0.2 to 3 percent of said pore volume is contributed by macropores.

3. a 350° F.–1050° F. boiling range hydrocarbon fraction is separated from said sulfur-reduced vacuum residuum from step (2) and combined with at least a portion of said vacuum gas oil, thereby producing a VGO-VRDS composite;
4. producing said low-sulfur content hydrocarbon mixture by contacting said VGO-VRDS composite with a second hydrodesulfurization catalyst and hydrogen gas in a second hydrodesulfurization zone under a hydrogen partial pressure in the range 300 to 800 psig and a temperature in the range 550 to 850° F., said catalyst comprising a sulfided composite of a Group VIII metal, a Group VIA metal and a catalyst base comprising alumina, said catalyst having a pore volume in the range from 0.3 to 1 cc per gram, the pores of said catalyst having a diameter in the range 0 to about 3000 Angstroms and an average pore diameter in the range 80 to 150 Angstroms, the pores of 80 to 150 Angstrom diameter contributing at least 70 percent of said pore volume.

4,006,077

DEMETALLIZATION OF ASPHALTENE-CONTAINING PETROLEUM HYDROCARBONS

Hans-George Wegner, Toppenstedt; Wolfgang Krüger, Bruhl; Günter Söchtig, Oststeinbek, and Günter Brandes, Hamburg, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed May 16, 1975, Ser. No. 578,283
Int. Cl.² C10G *25/00*
U.S. Cl. 208—251 H **8 Claims**

1. A process for the removal of metals from petroleum hydrocarbon charge materials containing metals and asphaltenes as contaminants in the presence of a clay mineral comprising contacting the charge materials at a temperature between about 200° and 500° and a pressure between about 1 and 300 bar in the presences of hydrogen with sorptive type attapulgus clay which has been extruded and then dried at a temperature between 100° and 650° C. until it contains less than 20 wt. % volatile components.

4,006,078

PREPARATION OF SOLUBLE EDIBLE PROTEIN FROM LEAFY GREEN CROPS

Emanuel M. Bickoff, Oakland; Donald de Fremery, Orinda; Richard H. Edwards, Albany; Benny E. Knuckles, San Pablo; George O. Kohler, El Cerrito, and Raymond E. Miller, Richmond, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 486,703, July 8, 1974, Pat. No. 3,971,060.
This application Apr. 11, 1975, Ser. No. 567,151
Int. Cl.² B01D *13/00*
U.S. Cl. 210—23 F **4 Claims**

1. A process for isolating soluble, odorless, bland protein suitable for human consumption, whih comprises

a. providing a juice containing soluble proteins from green leafy vegetable material, which juice has been treated to remove chloroplastic proteins, chlorphyll, carotenes, and lipids,

b. concentrating said juice by applying it under pressure against a membrane which will retain desired proteins having a molecular weight greater than about 20,000–100,000 but will allow substances of lesser molecular weight to pass therethrough,

c. purifying said concentrate by applying it under pressure against a membrane which will retain desired proteins having a molecular weight greater than about 20,000–100,000 but will allow substances of lesser molecular weight to pass therethrough, the volume of said concentrate being maintained constant by addition of water thereto,

d. acidifying said purified concentrate, at ambient temperature, to a pH of 3.5 to 5.5, whereby to precipitate the desired proteins therefrom, and

e. separating the precipitated protein from the residual juice.

4,006,079

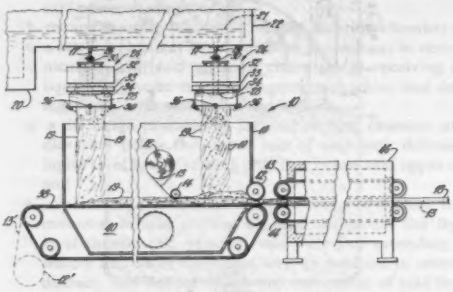
OIL ABSORBENT MATERIAL AND METHOD OF OIL REMOVAL

Roland E. Langlois, and Charles R. Morrison, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed May 16, 1975, Ser. No. 578,239
Int. Cl.² C02B *9/02*
U.S. Cl. 210—36 **1 Claim**

1. A method of removing oil from the surface of water contaminated with oil as when oil is spilled from an oil hauling vessel, comprising floating elongated blankets of non-woven, discontinuous glass fibers on the surface of the oil-contaminated water to absorb the oil, the glass fibers having been sprayed with phenol-formaldehyde as a binder and also having

been sprayed with silicone as a hydrophobic oleophilic agent solely before curing of the binder and then cured to cure the binder and bond the fibers to each other to form the blankets, and having no hydrophobic oleophilic agent thereon other than that sprayed thereon before the curing of the binder, each blanket having a width of from one to three feet and a length in excess of ten times the width, being capable of being fed lengthwise onto the surface of oil-contaminated water, having a density of from three-tenths to nine-tenths of a pound per cubic foot, having voids between the fibers throughout its



normal volume, the voids being present in sufficient numbers and of such a size as to enable the blanket to absorb oil in an amount over thirty times its weight, being reinforced with woven scrim having one set of strands generally parallel to the width of the blanket and another set of strands generally parallel to the length of the blanket, and having a tensile strength sufficient to enable it to be pulled lengthwise from the surface of the water when soaked throughout its length with a weight of oil over thirty times its own weight, and subsequently removing the blankets with the absorbed oil from the surface of the water.

4,006,080

PROCESS FOR THE TREATMENT OF ACIDIC WASTE LIQUID CONTAINING DISSOLVED SALTS

Walter Twist, Hartlepool, England, and Peter Spurgeon, Huelva, Spain, assignors to Tioxide Group Limited, Billingham, England

Filed Oct. 2, 1975, Ser. No. 619,002

Claims priority, application United Kingdom, Oct. 12, 1974, 44297/74; Nov. 16, 1974, 49700/74

Int. Cl.² C02B *1/26*

U.S. Cl. 210—45 **10 Claims**

1. A process for the treatment of an aqueous sulphuric acid solution of a metal salt, said solution containing dissolved iron which is substantially wholly in the ferrous state, comprising the following steps:

a. adjusting the pH value of the solution to one in the range 1 to 3 by the addition of a calcium compound to precipitate selectively calcium sulphate

b. separating the precipitated calcium sulphate and calcining it to form a compound selected from the group consisting of calcium sulphide and calcium oxide

c. adjusting the pH value of the mother liquor from (b) above to a value in the range 7 to 9 by the addition of a calcium-containing compound to precipitate solid metal-containing compound from the mother liquor and thereafter

d. separating and calcining the precipitated solids from (c) above.

4,006,081

METHOD FOR PREVENTING GELATION OF THERMOSETTING RESINS IN WASTE WATER

Nobutaka Nakamura, and Yukio Saeki, both of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

Filed Dec. 31, 1974, Ser. No. 537,812

Claims priority, application Japan, Jan. 8, 1974, 49-5106

Int. Cl.² C02B *1/18*

U.S. Cl. 210—58 **3 Claims**

1. A method of preventing gelation of waste wash water containing glues or varnishes of resorcinol resins and excess free aldehyde, which consists essentially of adding urea to the waste wash water at ambient temperature in an amount which is sufficient to prevent the aldehyde content of the waste wash water from causing gelation, agitating said waste wash water consisting essentially of urea, water, a resorcinol-aldehyde resin having from 0.5 to 0.8 of aldehyde per mole of of resorcinol, and excess free aldehyde contained in said waste wash water to react said urea with said excess free aldehyde and prevent gelation of said resins in said waste wash water.

4,006,082

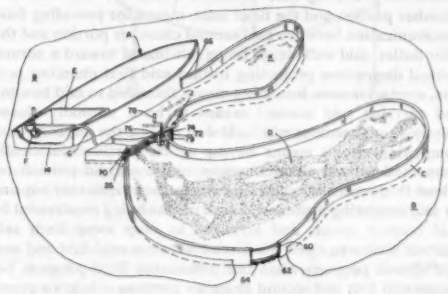
PROCESS FOR EMERGENCY SMALL SPILL CONTROL

Denis E. Irons, San Francisco, Calif., assignor to Murphy Pacific Marine Salvage Co., Emeryville, Calif.

Filed May 12, 1975, Ser. No. 576,944

Int. Cl.² E02B *15/04*

U.S. Cl. 210—83 **1 Claim**



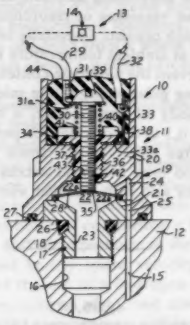
1. A process for the collection of lighter than water pollutant spills from a vessel working the spill, said process comprising the steps of: disposing a floating sump onto the surface of water near a spill; providing a floating and flexible boom having a first portion above water and a second portion below water; attaching one end of said boom to said floating sump; placing said boom in said water to surround at least a portion of said spill; providing take-up means disposed through the surface of said water at a second point on said sump; positioning said sump adjacent said vessel working the spill; threading one end of said boom through said take-up means with said spill contained between said sump and said boom; operating said take-up means to collect said boom to define a first decreasing area and contracting the area of said lighter than water pollutant spills; dead-ending the other end of said boom as passed through said take-up means to said vessel to define a second and increasing pollutant containment area; passing said boom through said take-up means in a first direction to sequentially decrease said first area and expand said second area; passing said boom through said take-up means in a second direction to sequentially decrease said second area and increase said first area; and, collecting said lighter than water pollutant spills from said first and second decreasing pollutant containment areas.

4,006,083

PRESSURE DIFFERENTIAL SWITCH

Ralph Westervelt, Pekin, and Lawrence F. Fratzke, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 9, 1975, Ser. No. 620,998
Int. Cl.² B01D *35/14*
U.S. Cl. 210—90 **12 Claims**



1. In an apparatus for indicating a clogged condition of a fluid filter having an inlet and an outlet; electrically conductive housing means defining a chamber, electrically conductive snap-action wall means extending across said chamber dividing the chamber into a first portion and a second portion, said wall means being electrically connected to said housing, means for providing fluid communication between said first chamber portion and the filter inlet, means for providing fluid communication between said second chamber portion and the filter outlet, said wall means being self-biased toward a normal conical disposition projecting toward said first chamber portion, contact means, insulating means threaded to said housing and carrying said contact means to have normally closed electrical engagement with said wall means, the improvement comprising circuit means having a first portion electrically connected to said contact means, and a second portion retained in electrically connected engagement with said housing by said insulating means, said wall means being prestressed by said contact means and arranged to snap away from said contact means to open the circuit between said first and second circuit portions when the differential fluid pressure between said first and second chamber portions reaches a preselected elevated value; and means responsive to the opening of the circuit to indicate the reaching of said elevated pressure.

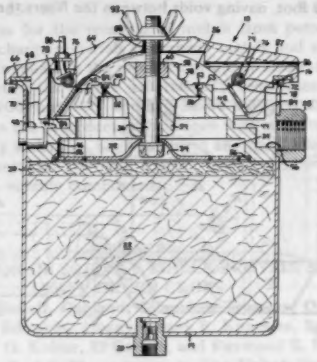
4,006,084

OIL RECLAIMING DEVICE

Glen R. Priest, Rte. 1, Box 3, Landmark Estates, Geronimo, Okla. 73543

Continuation-in-part of Ser. No. 358,893, May 10, 1973, abandoned. This application Dec. 26, 1974, Ser. No. 536,378
Int. Cl.² B01D *3/28*
U.S. Cl. 210—180 **9 Claims**

1. An oil reconditioning device for removing solid and liquid contaminants from lubricating oil comprising: a housing having an inlet at a lower end; an oil filter chamber in the lower portion of said housing; a filter in said filter chamber for removing said contaminants from said oil; a preheating chamber in said housing above said filter chamber; a hollow convex frustoconical vaporization plate comprising a plurality of concentric tiers within said housing on said filter above said filter chamber, the uppermost tier of said vaporization plate being provided with a plurality of circumferentially spaced capillaries for flow of oil and contaminants through said plate; the bottom face of said vaporization plate defining the roof of a frustoconical preheating chamber between said filter and said vaporization plate for initially heating oil and liquid contaminants to vaporize the more volatile of said contaminants; the top face of said vaporization plate defining the floor of a vaporization chamber within said housing; a perforated plate secured with the bottom of said vaporization plate defining a floor of said preheating chamber; heating means in the upper portion of said housing for heating said vaporization chamber, said vaporization plate and said preheating chamber; said



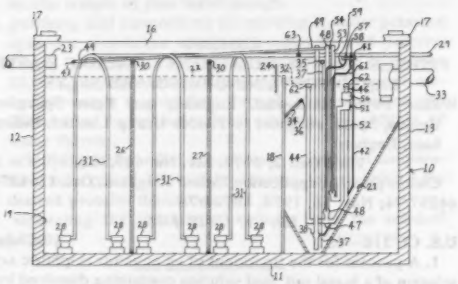
vaporization plate being formed of a heat conducting material for heating said preheating chamber; means defining a side outlet from said housing immediately above the lowermost tier of said vaporization plate opening into said vaporization chamber; and means providing a vent passage from said vaporization chamber in the upper portion of said housing for escape of vaporized contaminants from said vaporization chamber.

4,006,085

LIQUID TREATING APPARATUS

Orval Q. Matteson, 306 Reynolds St., Jacksonville, Ala. 36265

Filed Apr. 30, 1975, Ser. No. 573,351
Int. Cl.² C02C *1/08*
U.S. Cl. 210—195 S **12 Claims**



1. Liquid treating apparatus comprising:

a. an aeration chamber having an inlet for receiving the liquid to be treated and an outlet for discharging said liquid from said aeration chamber,

b. means of aerating said liquid in said aeration chamber,

c. a settling chamber having an inlet passageway and a discharge passageway in spaced relation to each other with said inlet passageway in communication with said outlet of said aeration chamber,

d. at least one permeable restraining member in said settling chamber of a fine mesh which restrains and dissipates currents yet permits liquid flow therethrough in a diffused manner and extending over substantially the entire cross-section of said settling chamber, between said inlet passageway and said discharge passageway with the upper

end of said restraining member extending above the high liquid level in said settling chamber and the lower end thereof terminating adjacent the bottom of said settling chamber and dividing said settling chamber into at least two compartments, and

c. sediment transfer means communicating with said settling chamber adjacent to the bottom thereof between said inlet passageway and said restraining member for transferring sediment from said settling chamber.

7. Liquid treating apparatus comprising:

a. an aeration chamber having an inlet for receiving the liquid to be treated and spaced from the discharge end of said aeration chamber.

b. means aerating said liquid in said aeration chamber,

c. a settling chamber having an inlet passageway in communication with said aeration chamber for receiving said liquid discharged from said aeration chamber and defining a weir over which the liquid flows,

d. a discharge passageway for said settling chamber at an elevation below the upper end of said weir defining a liquid level in said settling chamber below said upper end, and

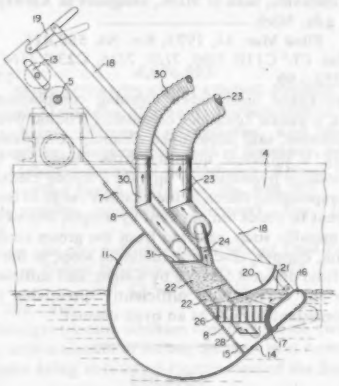
e. a permeable deflection member being of a close mesh mounted in said settling chamber subjacent the liquid level therein and adjacent said weir and extending upwardly and away from said weir in position to restrain, distract, and deflect downward movement of said liquid discharged over said upper end of said weir.

4,006,086

APPARATUS FOR REMOVAL OF OIL FILMS FROM WATER

Ikuo Tsunoi, Yokohama, Japan, assignor to Kabushiki-Kaisha Kyoei Senpaku Kogyo, Yokohama, Japan

Filed May 14, 1975, Ser. No. 577,554
Claims priority, application Japan, July 1, 1974, 49-75217
Int. Cl.² E02B *15/04*
U.S. Cl. 210—242 R **2 Claims**



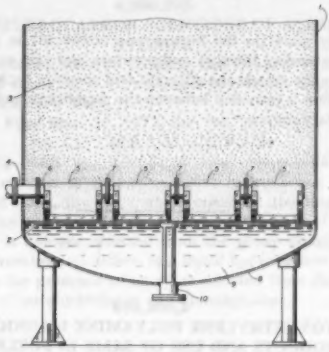
1. Apparatus for collecting light liquid from the surface of a body of water, said apparatus comprising an elongate chamber vertically arranged between the fuselages of a twinfuselage ship, an upper end of said chamber pivotably supported for swing movement in a direction parallel to an elongate axis of the fuselages with the lower end provided with float means for floatable support on the surface of water, inlet opening means in the lower end of the chamber in the direction of swinging movement, weir means pivotably connected to the lower edge of said inlet opening constructed and arranged to provide an adjustable lower edge for said inlet opening; horizontal plate means defining the upper edge of said inlet opening, said plate being inclined upwardly in the direction faced by said inlet opening and being spaced above said weir means, a perforate plate horizontally arranged within said chamber near the bottom thereof, pump and conduit means for removing water from said chamber, an inlet end of said conduit being located in said chamber beneath said perforate plate above the bottom of the chamber, pump and conduit means for removing oil from said chamber, an inlet end of said conduit being located in said chamber above the perforate plate and beneath the upper end of said chamber.

4,006,087

FLUID DISTRIBUTION SYSTEM

Thomas James Denton, Tulsa, Okla., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 23, 1975, Ser. No. 580,432
Int. Cl.² B01D *23/20*
U.S. Cl. 210—289 **2 Claims**



1. A drain system for a bed of granular media supported within a vessel, including,

a horizontal plate mounted in the lower portion of a vessel,

a pair of simple channels mounted by their first ends on the horizontal plate to extend vertically and segmented on their upper ends,

a conduit segment of tubular form having perforations the length of the underside of the conduit segment and fitted into and supported at each end within the segmented upper ends of the channels and connected to a conduit which extends through the vessel wall,

a rigid support grating extending between the sides of the channels and beneath the conduit to form an unobstructed volume beneath the perforations,

and a screen structure draped over the pipe segment and channel and sealed to the channel sides and plate to fix its mesh openings as a part of the path for fluid flowing to and from the perforations while laterally supported by the grating to isolate the media particles from the perforations.

4,006,088

SNAP-LOCK BUTTON-TYPE FLUID CONNECTOR WITH RECESS

Burton Salkin, Schaumburg, Ill., assignor to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,618
Int. Cl.² B01D *13/00*
U.S. Cl. 210/321 B **8 Claims**

1. A dialyzer comprising a semipermeable membrane, an external fluid conduit, a button-type connector connecting the semipermeable membrane to said external fluid conduit, said membrane having an aperture therethrough, said connector

including a cap and an integral barrel extending from said cap, said barrel having means defining at least one snap-lock recess in said barrel surface, and said connector having passageway extending through said barrel and cap, said dialyzer having complementary means for engaging said snap-lock recess to

lockingly maintain the button-type connector in place, said barrel extending through said aperture and said cap sealingly engaging the membrane adjacent said aperture such that a seal connection is provided between the membrane and said complementary means.

4,006,089

POLYOXYETHYLENE POLYAMINE MANNICH BASE PRODUCTS AND USE OF SAME IN FUELS AND LUBRICANTS

Sheldon Chibnik, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 19, 1974, Ser. No. 525,268

Int. Cl.² C10M *1/32*

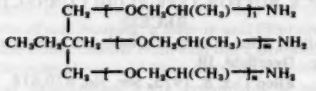
U.S. Cl. 252—51.5 R **11 Claims**

1. A lubricant composition comprising a major amount of a lubricating oil of lubricating viscosity and a minor detergent amount of a Mannich base product which is the condensation product of (1) a polyalkyl-substituted hydroxyaromatic compound wherein the polyalkyl has a number average molecular weight of from about 100 to about 4000, (2) an amine having one of the formulae

$$NH_2CH(CH_3)CH_2[OCH_2CH(CH_3)]_x NH_2$$

$$NH_2CH(CH_3)CH_2[OCH_2CH(CH_3)]_a [OCH_2CH_2]_b[OCH_2CH(CH_3)]_c NH_2$$

and



wherein x is chosen such that the molecular weight of the amine is from about 142 to about 2000, b is from about 10 to about 50, $a + c$ is about 3.5 and the sum of l, m and n is from about 3 to about 10 and (3) an aldehyde wherin the respective molar ratios of reactants are 1:0.1–10:0.1–10.

4,006,090

ALPHA IRON (III) OXIDE CRYSTALS AND DERIVATIVES

Henry Nelson Beck, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,044, June 28, 1974, Pat. No. 3,919,404. This application July 21, 1975, Ser. No. 597,723

Int. Cl.² C01G *49/06, 49/08*

U.S. Cl. 252—62.56 **5 Claims**

1. Porous, elongated, polycrystalline, hematite particles having lengths of from about 0.05 to about 5 microns, effective diameters of from about 0.02 to about 0.9 microns and aspect ratios of from about 1.2 to about 6,

said particles being physically composed of elongate microcrystallites, loosely adhered together in the form of a generally cylindrical bundle with their long axes generally parallel to the long axis of the bundle,

said microcrystallites having effective diameters of from about 80A up to about one half the effective diameter of said bundle, and

said particles being chemically composed of alpha iron oxide containing from about 2 to about 4 weight percent of chemically bound sulfate and from about 0.003 to about 0.02 weight percent of chemically bound lithium.

4. Magnetite particles produced by the reduction of the hematite particles of claim 1 and having the shape, size and fine structure thereof, said magnetite particles having magnetic susceptibilities of from 293 to 416 oersteds, saturization magnetizations of 78 to 88 e.m.u./gram and squareness ratios (δ_r/δ_s) of 0.33–0.42.

5. Gamma iron oxide particles produced by the oxidation of the magnetite particles of claim 4 and having the shape, size and fine structure of the hematite particles of claim 1 and having magnetic coercivities of from 196 to 306 oersteds, saturization megnetizations of 66–71 e.m.u./gram and squareness ratios (δ_r/δ_s) of 0.32–0.38.

4,006,091

PLASTIC BOTTLE STORABLE OVEN CLEANER

Richard A. Lindblom, Comstock Park, and Richard E. Madden, Middleville, both of Mich., assignors to Amway Corporation, Ada, Mich.

Filed Mar. 14, 1975, Ser. No. 558,411

Int. Cl.² C11D *7/06, 7/10, 7/26;* C23G *1/14*

U.S. Cl. 252—90 **27 Claims**

1. A packaged liquid oven cleaning composition which comprises: a plastic container containing a liquid oven cleaning composition, said liquid oven cleaning composition itself comprising: a sufficient quantity, from about 5% to about 12%, of sodium hydroxide to provide a strong cleaning base for the composition; starch in the quantity range of from about one per cent to about ten per cent by weight; one of a di- and trivalent metallic soap, selected from the group consisting of magnesium, copper, zinc and aluminum soap, in the quantity range of from about 0.5 to 5% by weight; and sufficient water to render the composition sufficiently spreadable yet sufficiently consistent for use as an oven cleaner.

4,006,092

LAUNDERING AID

J. Paul Jones, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 230,491, Feb. 29, 1972, abandoned. This application Aug. 1, 1973, Ser. No. 384,528

The portion of the term of this patent subsequent to Jan. 25, 1994, has been disclaimed.

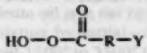
Int. Cl.² C11D *3/395*

U.S. Cl. 252—95 **6 Claims**

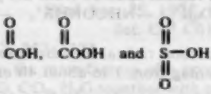
1. A dye transfer inhibiting composition consisting essentially of

a. from about 2 to about 75% by weight of a peroxygen compound selected from the group consisting of (1)

water-soluble monopersulfates (2) water-soluble monoperphosphates, (3) organic peroxyacids having the general formula



wherein R is selected from the group consisting of alkylene groups containing from about 1 to about 16 carbon atoms and arylene groups containing from about 6 to about 8 carbon atoms, and Y is selected from the group consisting of hydrogen, chlorine, methyl, phenyl,



(4) water-soluble salts of said peroxyacids, and (5) mixtures of compounds selected from groups (1) through (4);

b. from about 0.2 to 40% by weight of an activator compound selected from the group consisting of aldehydes, ketones, and compounds which yield aldehydes or ketones in aqueous solution, said activator producing a Relative Oxidation Constant of 0.25 or greater;

c. from about 5 to 40% by weight of a polyvinyl compound selected from the group consisting of vinylpyrrolidone-acylonitrile copolymers, vinylpyrrolidone-maleic anhydride copolymers and poly-4-vinyl-methyl-pyridinium iodide;

d. from about 1 to about 85% of a buffering compound capable of maintaining the pH of an aqueous solution of said dye transfer inhibiting composition within the range of from about 7 to about 12;

said composition being substantially free of anionic surfactants.

4,006,093

SURFACTANTS CONTAINING IODINE

Paul Diessel, Mannheim, Germany; Herbert Helfert, Trenton, Mich.; Reiner Hamm, Ludwigshafen, and Hans-Georg Scharpenberg, Limburgerhof, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 6, 1974, Ser. No. 530,303

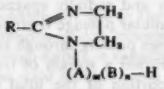
Claims priority, application Germany, Dec. 17, 1973, 2362580

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C11D *3/48*

U.S. Cl. 252—106 **4 Claims**

1. A detergent-iodine addition complex which yields a germicidally active amount of iodine, the detergent component of the complex being at least one compound of the formula



in which R is alkyl or alkenyl of 2 to 22 carbon atoms, A is an ethylene oxide radical, B is a propylene oxide radical, *m* is an integer from 10 to 30 and *n* is an integer from 3 to 10, and the ratio *n:m* is from 1:2 to 1:8, and the amount of iodine bound in said complex being from 15 to 40% by weight, based on the detergent component.

4,006,094

HAND DRYING AND CONDITIONING MATERIAL

Marshall Pellar, 7070 Fairway Road, La Jolla, Calif. 92037

Filed Nov. 7, 1973, Ser. No. 413,667

Int. Cl.² C09K *3/14*

U.S. Cl. 252—194 **2 Claims**

1. A hand drying and conditioning material comprising in combination:

a base of wood material in small rough particles having a particle size of 1/32" screen size or smaller,

a small quantity of powdered tricalcium phosphate desiccant material comprising two to twenty percent by weight of said wood particles,

said wood particles being selected from the group consisting of redwood, peanut hulls, and corn husks.

4,006,095

STABLE HYDROCARBON SOLUTIONS OF ALUMINUM HYDRIDE

Doyt K. Hoffman; Ricardo O. Bach, and Conrad W. Kamienski, all of Gastonia, N.C., assignors to Lithium Corporation of America, New York, N.Y.

Filed Mar. 31, 1972, Ser. No. 239,993

Int. Cl.² C01B *6/06;* **C07F** *5/06*

U.S. Cl. 252—188 **14 Claims**

1. In a method of preparing liquid hydrocarbon solvent solutions of AlH_3, the steps which comprise reacting essentially 3 moles of an alkali metal hydride with 1 mole of $AlHal_3$, where Hal is halogen selected from the group consisting of chlorine, bromine and iodine, in a liquid hydrocarbon solvent medium in the presence of an ether selected from the group consisting of tetrahydrofuran and dimethylether.

4,006,096

METHOD OF MAKING FISSIONABLE-FUEL AND FERTILE BREEDER MATERIALS FOR NUCLEAR REACTORS

Rüdiger Förthmann; Muwaffak Hamesch, and Hubertus Nickel, all of Julich, Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Division of Ser. No. 210,247, Dec. 20, 1971. This application Jan. 26, 1973, Ser. No. 326,823

Claims priority, application Germany, Dec. 24, 1970, 2063720

Int. Cl.² G21C *3/62;* **G09K** *3/00*

U.S. Cl. 252—301.1 S **2 Claims**

1. A method of preparing a nuclear material for a nuclear reactor which comprises the steps of:

a. precipitating an aqueous solution of a nuclear material selected from the group which consists of thorium and uranium nitrates with ammonium hydroxide and filtering the precipitate,

b. combining the precipitate with an aqueous solution containing a water soluble aluminum or niobium salt and nitric acid heated to boiling to form a colloidal solution,

c. partially evaporating the colloidal solution and mixing with hexamethylenetetramine and adding to a paraffin oil bath to form particles,

d. freeing the particles by washing with petroleum ether and extracting the ammonium nitrate by storing under a concentrated ammonia solution, removing the particles by filtration and air drying,

e. sintering the particles until dense fuel cores form, and

f. coating the fuel particles with a pyrocarbon layer.

4,006,097

YB ACTIVATED HAFNIUM OXIDE PHOSPHOR AND METHODS OF MAKING

Paul V. Kelsey, Jr., Blacksburg, Va., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Continuation-in-part of Ser. No. 509,293, Sept. 24, 1974, abandoned. This application May 5, 1975, Ser. No. 574,275

Int. Cl.² C09K *11/46*

U.S. Cl. 252—301.4 F **2 Claims**

1. A method of making a phosphor composition having the general formula HfO_2:Yb with Yb being present in an amount of from 0.005 to 0.10 moles per mole of hafnium which comprises the steps of: forming a substantially homogeneous mixture of appropriate amounts of the oxides of hafnium and ytterbium to yield the desired formulation; firing said mixture in a controlled atmosphere furnace under a nitrogen atmosphere for about 6 hours at about 1000° C; and mortaring said fired mixture and refiring in a nitrogen atmosphere at about 1250° C for about 6 hours.

2. A method of making a phosphor composition having the general formula HfO_2:Yb with Yb being present in an amount of from 0.005 to 0.10 moles per mole of hafnium which comprises the steps of: forming an aqueous solution of appropriate amounts of $HfOCl_2.8H_2O$ and Yb_2O_3; adding a sufficient amount of HNO_3 to said solution to solubilize said Yb_2O_3 and heating and stirring constantly at a temperature of about 70° C until a clear solution is obtained; adding a precipitating agent selected from the group consisting of oxalic acid, ammonium carbonate, and ammonium hydroxide to form a precipitate; filtering and drying said precipitate; and first firing said precipitate in a controlled atmosphere furnace with a nitrogen atmosphere at about 980° C to 1000° C for about 2 hours and second firing said precipitate in said furnace at about 1200° C for 2 hours.

4,006,098

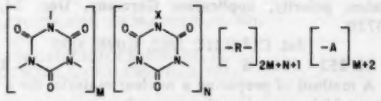
POLYISOCYANURATE SALT EMULSIFYING AGENTS AND DERIVATIVES

Perry A. Argabright, Larkspur; C. Travis Presley, Littleton, and Charles B. Wenger, Denver, all of Colo., assignors to Marathon Oil Company, Findlay, Ohio

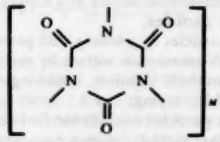
Continuation-in-part of Ser. No. 224,905, Feb. 9, 1972. This application Sept. 13, 1974, Ser. No. 505,716

Int. Cl.² B01J *13/00;* **B01F** *17/30, 17/16*

U.S. Cl. 252—312 **7 Claims**



1. A composition comprising a mixture of compounds containing in a single molecule isocyanurate and metal isocyanurate, and having the general structure



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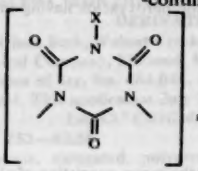


wherein

R = divalent hydrocarbon or substituted hydrocarbon radical, containing 2 to about 40 carbon atoms,

X is selected from the group consisting of metals, or quaternary ammonium radicals,

A is a monovalent organic radical selected from the group consisting of $—NHCO_2R'$, —NHCONHR', $—NH_2$, —NHR', and $—NR'_2$,

R' is a monovalent hydrocarbon radical or substituted hydrocarbon radical containing from 1 to about 40 carbon atoms,

M is the average number of trisubstituted isocyanurate rings per molecule and is a positve integer from zero to about 400,

2M+N+1 = the average number of divalent R groups and is a positive integer from 2 to about 11,000, and wherein

M+2 is the average number of A groups and is a positive integer from 2 to about 400, and wherein there are no N-to-N bonds, No A-to-N bonds, no A-to-A bonds and no R-to-R bonds,

N is the average number of isocyanurate salt groups and is a positive integer from 1 to about 10,000, are useful emulsifying agents.

4,006,099

MANUFACTURE OF GASEOUS MIXTURES COMPRISING HYDROGEN AND CARBON MONOXIDE

Charles P. Marion, Mamaroneck, N.Y., and William B. Crouch, Whittier, Calif., assignors to Texaco Inc., New York, N.Y.

Filed June 16, 1975, Ser. No. 587,191

Int. Cl.² C01B *2/14*

U.S. Cl. 252—373 **2 Claims**

1. In the manufacture of a product gas mixture comprising H_2 and CO, together with CO_2, H_2O, particulate carbon, and one or more materials from the group consisting of CH_4, COS, H_2S, A, and N_2 by the partial oxidation of a dispersion of petroleum oil and steam with a free-oxygen containing gas in the reaction zone of a free-flow noncatalytic gas generator at a pressure in the range of about 1 to 250 atmospheres and at an autogenous temperature in the range of about 1500° to 3500° F, wherein said reactants are introduced into the reaction zone of said gas generator by way of a double-annulus-type burner having a central cylindrical conduit, an intermediate coaxial conduit with a converging nozzle at the downstream tip of the burner, said intermediate conduit surrounding said central conduit and being longitudinally and radially spaced therefrom so as to provide an intermediate annular passage therebetween, and an outer coaxial conduit with a converging nozzle at the downstream tip of the burner, said outer conduit surrounding said intermediate conduit and being longitudinally and radially spaced therefrom so as to provide an outer annular passage therebetween; the improvement which comprises passing through said central conduit of said annulus-type burner a stream of free-oxygen containing gas comprising a portion of the total oxygen subsequently required in the reaction zone, simultaneously passing through said intermediate annular passage said stream of petroleum oil-steam dispersion; simultaneously passing through said outer annular passage a stream of free-oxygen containing gas comprising the remainder of the free-oxygen required in the reaction zone, wherein the linear velocities of said stream of free-oxygen containing gas are in the range of about 300 to

990 feet per second, and the linear velocity of said stream of petroleum oil-steam dispersion is in the range of about 650 to 1100 ft. per sec. and is at a higher velocity than either or both of said streams of free-oxygen containing gas; impinging said three streams together so as to produce a mixture in which the atomic ratio of free-oxygen in the oxidant to carbon in the petroleum oil is in the range of about 0.8 to 1.35; and reacting said mixture by partial oxidation at a temperature in the range of about 1500° to 3500° F and a pressure in the range of about 1 to 250 atmospheres to produce said product gas mixture.

4,006,100
MANUFACTURE OF GASEOUS MIXTURES COMPRISING HYDROGEN AND CARBON MONOXIDE

William B. Crouch, Whittier, Calif., assignor to Texaco Inc., New York, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,775
Int. Cl.² C01B 2/14
U.S. Cl. 252—373 **4 Claims**

1. In the manufacture of a product gas mixture comprising H_2, CO, CO_2, H_2O together with particulate carbon and impurities selected from the group consisting of CH_4, COS, H_2S, A, N_2, and mixtures thereof by the partial oxidation of a liquid hydrocarbonaceous fuel selected from the group consisting of petroleum distillate and residua, gas oil, residual fuel, reduced crude, whole crude, asphalt, coal tar, coal oil, shale oil, tar sand oil, and mixtures thereof with a free-oxygen containing gas in the reaction zone of a free-flow noncatalytic gas generator at a pressure in the range of about 1 to 250 atmospheres and an autogenous temperature in the range of about 1500° to 3500° F, and wherein said reactants are introduced into the reaction zone of said gas generator by way of a annulus-type burner having a central coaxial cylindrical conduit, an outer coaxial conduit with a converging nozzle at the downstream tip of the burner, said outer conduit surrounding said central conduit and being longitudinally and radially spaced therefrom so as to provide an annular passage therebetween, the improvement which comprises passing through said central conduit of said annulus-type burner a stream of said liquid hydrocarbonaceous fuel in liquid phase at a velocity in the range of about 0.1 to 1 foot per second, simultaneously passing through said annular passage at a velocity in the range of about 50 feet per second to sonic velocity a stream of free-oxygen containing gas in admixture with a temperature moderator; impinging said streams together so as to produce an atomized mixture in which the atomic ratio of free-oxygen to carbon in the fuel is in the range of about 0.6 to 1.5; and reacting said atomized mixture to produce said product gas mixture.

4,006,101
POLYMERIZATION OF OLEFINS AND CATALYSTS THEREFOR

Kazuo Matsuura, Kawasaki; Nobuyuki Kuroda, Yokohama; Takeichi Shiraishi, Kawasaki, and Mitsuji Miyoshi, Kanagawa, all of Japan, assignors to Nippon Oil Company Ltd., Japan

Continuation-in-part of Ser. No. 439,959, Feb. 5, 1974, abandoned. This application Aug. 29, 1975, Ser. No. 608,898
Claims priority, application Japan, Feb. 9, 1973, 48-16157
Int. Cl.² C08F 4/02, 4/64, 4/68
U.S. Cl. 252—429 C **3 Claims**

1. A catalyst composition for use in the polymerization or copolymerization of olefins which consists essentially of a solid carrier and a titanium halide, a vanadium halide mixtures thereof carried thereon, said halides being liquid at the treatment conditions, said titanium halide being titanium tetrachloride, titanium tetrabromide, ethoxy trichlorotitanium, diethoxy dichlorotitanium, dibutoxy dichlorotitanium or phenoxy trichlorotitanium and said vanadium halide being vanadium tetrachloride or oxytrichlorovanadium, said solid carrier resulting from the reaction of

a. anhydrous magnesium halide

b. silicon tetrachloride, and

c. a compound having the general formula

ROH

where R is an organic group of 1 to 20 carbon atoms, said organic group being an alkyl, alkenyl, aryl or aralkyl group or substituted alkyl, alkenyl, aryl or aralkyl group, in which the substituents do not substantially react with the other components of the composition, the mol ratio of the compound ROH to silicon tetrachloride being in the range from 1 to 1/10 to 100, and the mol ratio of said anhydrous magnesium halide to said silicon tetrachloride being 1 to 0.01 to 100, the reaction being carried out at a temperature of from 10° to 300° C.

4,006,102
STABILIZED RHENIUM CATALYST

Haren S. Gandhi, Dearborn Heights; Mordecai Shelef, Southfield; Henryk K. Stepien, Detroit, and Hsin C. Yao, Dearborn Heights, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 25, 1975, Ser. No. 607,658
Int. Cl.² B01J 21/04, 21/08, 23/36
U.S. Cl. 252—454 **4 Claims**

1. A rhenium catalyst resistant to volatilization after oxidation to a higher oxidation state consisting of:

a catalyst substrate formed of a ceramic material;

a refractory oxide coating on said substrate;

rhenium metal deposited on said refractory oxide coating in a finely divided form;

said refractory oxide coating being present in an amount in excess of 15% by weight of the total weight of the substrate.

4,006,103
CATALYST FOR TREATING EXHAUST GAS FROM INTERNAL COMBUSTION ENGINE

Garbis H. Meguerian, Olympia Fields; Eugene H. Hirschberg, Park Forest, and Frederick W. Rakowsky, Naperville, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 336,256, Feb. 27, 1973, abandoned. This application Nov. 3, 1975, Ser. No. 628,352
Int. Cl.² B01J 21/04, 23/40, 23/74, 27/24
U.S. Cl. 252—438 **17 Claims**

1. A catalyst for the reduction of nitrogen oxides in the exhaust gas from an internal combustion engine, which catalyst comprises a nickel component, a rhodium component, and a monolithic ceramic support for said nickel component and said rhodium component, said nickel component being present in an amount ranging from 2.5 to 12 wt.%, expressed as the metal and based on total catalyst weight, and comprising at least 75 wt.% of the total active metals present, and said rhodium component being present in an amount ranging from 0.01 to 0.08 wt.%, expressed as the metal and based on total catalyst weight, said catalyst being prepared by sequentially applying in the order specified hereinbelow to said monolithic ceramic support first a solution containing a dissolved salt of nickel and second a solution containing a dissolved salt of rhodium, the application of each solution being followed by the removal of the diluent of that solution by drying to deposit on the support the salt of that solution and the calcination of the support with the salt of that solution thereon, said calcination being conducted in air at a temperature of about 1,000° to 1,500° F.

4,006,104

PROCESS FOR CONVERTING γ-BUTYROLACTONE INTO TETRAHYDROFURAN

Georg Michalczyk, Neukirchen-Vluyn, and Karl-Heinz Gluzek, Alpen, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Division of Ser. No. 488,351, July 15, 1974, Pat. No. 3,969,371. This application Sept. 15, 1975, Ser. No. 613,396
Claims priority, application Germany, Aug. 3, 1973, 2339344
Int. Cl.² B01J *23/84*
U.S. Cl. 252—465 3 Claims

1. A catalyst suitable for the high conversion of γ-butyrolactone selectively to tetrahydrofuran consisting essentially of cobalt-modified copper chromite on aluminum oxide, wherein said catalyst comprises from about 12.0 to 14.5 weight percent CoO, from about 12.5 to 16.0 weight percent CuO, from about 15.5 to 19.5 weight percent Cr_2O_3 and the balance aluminum oxide.

4,006,105

NO_x REDUCTION CATALYST FOR INTERNAL COMBUSTION ENGINE EMISSION CONTROL

Robert J. Fedor, Westlake, and Cameron S. Ogden, Hudson, both of Ohio, assignors to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 441,504, Feb. 11, 1974; Ser. No. 451,032, March 22, 1974; Ser. No. 453,567, March 22, 1974; Ser. No. 457,101, April 1, 1974; Ser. No. 460,742, April 15, 1974; Ser. No. 460,786, April 15, 1974; Ser. No. 460,787, April 15, 1974; Ser. No. 460,436, April 15, 1974; Ser. No. 466,737, May 3, 1974; Ser. No. 466,965, May 6, 1974; Ser. No. 467,106, May 6, 1974; all abandoned, which in turn are a continuation-in-part of Ser. No. 207,338, filed Dec. 3, 1971; Ser. No. 207,284, Dec. 13, 1971; Ser. No. 207,337, Dec. 13, 1971; Ser. No. 207,303, Dec. 13, 1971; Ser. No. 240,028, Mar. 31, 1972; Ser. No. 240,029, Mar. 31, 1972; Ser. No. 240,091, Mar. 31, 1972; Ser. No. 240,090, Mar. 31, 1972; Ser. No. 240,092, Mar. 31, 1972; Ser. No. 207,281, Dec. 13, 1971; Ser. No. 207,525, Dec. 13, 1971, all abandoned, which in turn are a continuation-in-part of Ser. No. 149,331, June 2, 1971 abandoned. The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.
Int. Cl.² B01J *21/04, 23/72, 23/86, 35/04*
U.S. Cl. 252—465 23 Claims

1. A catalytic structure capable of reducing the concentration of undesirable gases in the exhaust gases of an internal combustion engine by chemically reducing oxides of nitrogen, said structure having high NO_x reducing activity and comprising a thin, expanded metal foil structure having a plurality of strands defining openings therebetween said structure consisting essentially of a metallic reinforcing member and a metallic catalytic surface layer metallurgically bonded thereto, said layer comprising an NO_x reducing catalyst comprising a mixture of nickel and copper, said metallic reinforcing member comprising:

i. from about 50 to 85 weight percent of a first metal selected from the group consisting of nickel, mixtures of nickel and cobalt, mixtures of nickel and iron, and mixtures of nickel, iron and cobalt, said iron and cobalt individually not exceeding about 1 weight percent of said member and said nickel being present in said mixtures in an amount of at least about 48 weight percent of said member, and

ii. from about 15 to about 50 weight percent of a second metal selected from the group consisting of chromium and mixtures of chromium and aluminum, said aluminum not exceeding about 10 weight percent of said member and said chromium being present in said mixtures in an amount of at least about 5 weight percent of said member.

4,006,106

SELF SEALABLE GLASSY RESISTOR COMPOSITION FOR A RESISTOR SEALED SPARK PLUG

Mitsutaka Yoshida, Chita, and Masao Sakai, Kasugai, both of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Sept. 29, 1975, Ser. No. 617,596
Claims priority, application Japan, Oct. 8, 1974, 49-115145
Int. Cl.² H01B *1/02, 1/04;* H01C *1/02, 1/04*
U.S. Cl. 252—513 3 Claims

1. A self sealable glassy resistor composition for a resistor sealed spark plug consisting essentially of 5–40% by weight of at least one of the resistance value stabilizing component selected from the group consisting of oxides of metals of Groups IVb and Vb of the Periodic Table, La_2O_3, ThO_2 and SiC; a water soluble carbonaceous material selected from the group consisting of: sugar, lactose, maltose, raffinose, glucose, xylose, dextrine methyl cellulose, ethylene glycol, glycerine, propylene glycol, polyethylene glycol and polyvinyl alcohol, present in such an amount that 0.1–5.0% by weight of carbon value is contained in the final composition, 35–85% by weight of borosilicate glass powder, 5–25% by weight of at least one metal or alloy, the melting point of which is higher than the glass seal temperature, said metal or alloy being selected from the group consisting of: Fe, Fe—B, Fe—Ti, Cu, Ni, Cr, Mn and Ni—Cr, and 2–20% by weight of at least one metal or alloy, the melting point of which is lower than the glass seal temperature, said metal or alloy being selected from the group consisting of: Sn, Sb, Zn, Al, Pb, Te, Cu—Sn and Cu—Zn, provided that the total amount of both the higher melting point metal or alloy and the lower melting point metal or alloy is not greater than 30% by weight.

4,006,107

METHOD OF PRODUCING TERNARY LEAD MOLYBDENUM SULFIDES

Simon Foner, Belmont; Edward J. McNiff, Jr., and Edwin J. Alexander, both of Danvers, all of Mass., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 13, 1975, Ser. No. 604,384
Int. Cl.² C01B *17/00;* H01L *39/00*
U.S. Cl. 252—518 3 Claims

1. A method of preparing a compound having a T_c of at least about 12.3 K and an H_{c2} of at least about 400 kG at 4.2 K comprising the steps of:

a. mixing commercial reagent grade powders of lead, molybdenum and sulfur in the atomic proportions of $Pb_zMo_6S_x$ where $z = 5.4–7.2$, $y = 4.5–5.6$, and $x = 0.8–1.1$;

b. heating the aforementioned mixture in a sealed, evacuated container to a temperature in the range of 950°–1150° C;

c. maintaining the temperature until the compound is formed; and

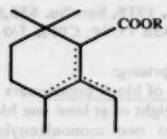
d. cooling the compound to ambient temperature at a controlled rate not in excess of 4° C per minute.

4,006,108
Z-ETHYL-3,6,6-TRIMETHYL-2-CYCLOHEXENE-1-CARBOXYLIC ACID ESTERS

Paul Albert Ochsner, Geneva, and Hanspeter Schenk, Zumikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Filed Apr. 14, 1975, Ser. No. 567,891
Claims priority, application Switzerland, Apr. 19, 1974, 5436/74; Feb. 13, 1975, 1772/75
Int. Cl.² C11B *9/00*
U.S. Cl. 252—522 **5 Claims**

1. A cyclogeranoyl compound of the general formula



(Va)

wherein R represents a C_{1-4} alkyl or phenyl group and one of the three lines indicated by dots represents an additional bond.

4,006,109
TRIMETHYL NONENE ALCOHOLS AND PERFUME COMPOSITIONS

Paul Albert Ochsner, Geneva, and Karl-Fred De Polo, Onex, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Filed Mar. 10, 1975, Ser. No. 556,991
Claims priority, application Switzerland, Mar. 15, 1974, 3628/74
Int. Cl.² C11B *9/00*
U.S. Cl. 252—522 **5 Claims**

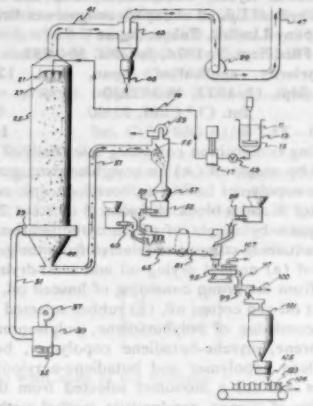
1. An odorant composition which comprises an olfactorily-effective amount of an alcohol of formula I given in claim 1 and at least one other olfactory agent.

4,006,110
MANUFACTURE OF FREE-FLOWING PARTICULATE HEAVY DUTY SYNTHETIC DETERGENT COMPOSITION

Edward J. Kenney, Bernardsville; Frank R. Smith, Jr., North Plainfield, and Walter A. DiSalvo, North Arlington, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 203,365, Nov. 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 124,111, March 15, 1971, Pat. No. 3,838,072, and a continuation-in-part of Ser. No. 134,324, April 15, 1971, Pat. No. 3,886,098. This application May 13, 1974, Ser. No. 469,502
The portion of the term of this patent subsequent to Sept. 24, 1991, has been disclaimed.
Int. Cl.² C11D *1/22, 1/83*
U.S. Cl. 252—540 **10 Claims**

1. A method of preparing a particulate detergent composition which comprises spraying onto a particulate base detergent composition consisting essentially of a water soluble anionic sulf(on)ate synthetic organic detergent having a higher linear alkyl chain therein, 0 to about 36 nonionic detergent, sodium silicate and adjuvant(s), the particles of which are substantially all within the 6 to 140 mesh U.S. Standard Sieve series range and contain less than 5% of particles passing through a 200 mesh sieve, with the ratio of sulf(on)ate detergent to sodium silicate being from 3:1 to 1:3 and with said sodium silicate being of a $Na_2O:SiO_2$ ratio in the range of 1:1.6 to 1:3, while maintaining the particles in motion, from 1 to 6% of a normally solid nonionic detergent in liquid state, at a temperature of 40° to 90° C., with the amount of nonionic detergent in the product being from 1/15 to 1/4 that of the anionic detergent, said nonionic detergent being selected from the group consisting of higher alkoxy poly-lower alkoxy lower alkanols and nonyl or higher alkyl aryloxy poly-lower alkoxy lower alkanols wherein higher designates a carbon atom con-



tent of 10 to 16, lower designates a carbon atom content of 2 to 3 and the aryl of the aryloxy radical is selected from the group consisting of phenyl, toluyl and xylyl and the poly-lower alkoxy lower alkanol group in said nonionic detergent compound contains 4 to 100 mols of lower alkylene oxide per mol.

4,006,111
PRODUCTION OF ALKANE: OLEFIN SULFONATE MIXTURES BY SEQUENTIAL SULFONATION AND SULFITATION

Virender Nath Malhotra, and John Mather, both of Wirral, England, assignors to Lever Brothers Company, New York, N.Y.

Filed July 11, 1973, Ser. No. 378,082
Claims priority, application United Kingdom, July 12, 1972, 36252/72
Int. Cl.² C07D *139/12, 143/16;* C11D *1/14, 1/37*
U.S. Cl. 252—555 **4 Claims**

1. A process for preparing a mixture of alkane and alpha-olefin sulfonates containing from 6 to 20 carbon atoms for use in detergent formulations, by sulphonation and sulphitation of an alpha-olefin feedstock characterized in that the total alpha-olefin feedstock containing from 6 to 20 carbon atoms is subjected to incomplete sulphonation with a conversion of from 10 to 70%, and sulphitation sequentially.

4,006,112
STARCH/POLYESTER BASED ON TRIMELLITIC ACID COMPOUND

Mark E. Bateman, Woodridge, and Eugene M. Holda, Glen Ellyn, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 512,109, Oct. 4, 1974, Pat. No. 3,931,422. This application Apr. 23, 1975, Ser. No. 570,709
Int. Cl.² C08L *3/02*
U.S. Cl. 260—9 **5 Claims**

1. A composition comprising degraded starch and a polyester of a polyhydric alcohol and a trimellitic acid compound, said polyester having an average molecular weight under about 4,000 and an acid number of at least 35, wherein said polyester is present in a weight ratio of 0.1 to 100 parts by weight per each 100 parts by weight starch solids.

4,006,113

NOVEL COATING COMPOSITION CONTAINING ACETYLENE-CONJUGATED DIENE RANDOM COPOLYMERS

Junji Furukawa, Kyoto; Eiichi Kobayashi, and Takahiro Kawagoe, both of Uji, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Sept. 9, 1974, Ser. No. 504,032

Claims priority, application Japan, Sept. 12, 1973, 48-102229; Sept. 12, 1973, 48-102230

Int. Cl.² C08L *91/00*

U.S. Cl. 260—23.7 R **10 Claims**

1. A coating composition consisting essentially of

100 parts by weight of (A) an acetylene-conjugated diene random copolymer having an acetylene unit content of 5–60 mol % and a block character P of 0.8–1.2 and

5–1,000 parts by weight of (B) a carbon-carbon double bond-containing compound selected from the group consisting of (a) natural drying oil and semi-drying oil selected from the group consisting of linseed oil, tung oil, coconut oil and cotton oil, (b) rubber selected from the group consisting of polybutadiene, polyisoprene, polychloroprene, styrene-butadiene copolymer, butadiene-isobutylene copolymer and butadiene-acrylonitrile copolymer and (c) a monomer selected from the group consisting of styrene, acrylonitrile, methyl methacrylate, acrylamide, vinyl acetate, vinyl pyridine and maleic anhydride.

4,006,114

FLAME RETARDANT POLYPROPYLENE COMPOSITIONS

Allen William Carlson, Wayne, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Nov. 26, 1975, Ser. No. 635,505

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5 D **9 Claims**

1. A flame retardant polypropylene composition which comprises:

a. polypropylene resin

b. sufficient chlorinated polyethylene to provide a weight ratio of chlorinated polyethylene to polypropylene in the range from about 20:80 to about 50:50, said chlorinated polyethylene containing from about 20 to about 55 percent by weight bound chlorine;

c. at least 5 parts by weight of antimony oxide per 100 parts of the combined weights of polypropylene and chlorinated polyethylene;

d. at least 15 parts by weight of chlorinated paraffin hydrocarbon per 100 parts of the combined weights of polypropylene and chlorinated polyethylene, said chlorinated paraffin hydrocarbon containing on the average from about 18 to 36 carbon atoms per molecule and between about 40 to about 80 percent by weight bound chlorine.

e. at least 20 parts by weight of alumina trihydrate per 100 parts of the combined weights of polypropylene and chlorinated polyethylene.

4,006,115

PHTHALATE ESTER CONTAINING NYLON COMPOSITION

Donald Lee Elbert, Gulf Breeze, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 26, 1974, Ser. No. 536,670

Int. Cl.² C08K *3/22, 5/12*; C08L *77/00*

U.S. Cl. 260—31.8 N **13 Claims**

1. A composition of matter comprising a nylon resin, an additive insoluble in the nylon resin selected from the group consisting of fillers, and flame-retardant synergists and from 0.1 to 10 percent by weight of a phthlate ester of a C_4 to C_{12} alkyl or cycloalkyl alcohol or a phenol, wherein the filler is from 5 to 50 weight percent of the total composition and the flame-retardant synergist is from 1 to 10 weight percent of the total composition.

4,006,116

BLOCK COPOLYMER COMPOSITIONS AND ARTICLES

Richard J. G. Dominguez, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 26, 1975, Ser. No. 635,564

Int. Cl.² A43B *13/04*; C08K *5/01*

U.S. Cl. 260—33.6 AQ **8 Claims**

1. A composition comprising:

a. 100 parts by weight of block copolymers including

a_1 50–90 parts by weight of at least one block copolymer A having at least two monoalkenylarene polymer blocks and at least about 95% hydrogenated polymer block of a conjugated diene, said copolymer comprising 25–35% by weight of monoalkenylarene polymer blocks, each of the latter having an average molecular weight between about 7,500 and 15,000;

a_2 10–50 parts by weight of at least one block copolymer B having at least two monoalkenylarene polymer blocks and at least about 95% hydrogenated polymer block of a conjugated diene, said copolymer comprising 25–36% by weight of monoalkenylarene polymer blocks, each of the latter having an average molecular weight between about 20,000 and 37,000;

b. 50–150 parts by weight of a hydrocarbon oil containing less than about 30% by weight of aromatics;

c. 25–90 parts by weight of an alpha-olefin polymer having a melt flow between 5 and 25 dg/min.;

d. 0–35 parts by weight of resin; and

e. 0–150 parts by weight of a finely divided filler.

4,006,117

AMINE PHOSPHITE ANTIOXIDANTS

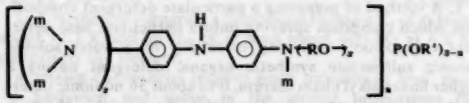
D. Bruce Merrifield, Williamsville; Joseph A. Pawlak, Cheektowaga, and James G. Colson, Williamsville, all of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 326,200, Jan. 24, 1973, abandoned. This application June 6, 1975, Ser. No. 584,445

Int. Cl.² C08K *5/52*

U.S. Cl. 260—45.9 NP **12 Claims**

1. A method of stabilizing organic substrates against atmospheric degradation comprising incorporating therein a stabilizing amount of at least one compound of the formula



wherein

R is selected from the group consisting of ethylene, 1,2-propylene, 1,2-butylene, 2,3-butylene, styrylene and mixtures thereof,

X is an integer from 1 to 12,

R′ is substituted or unsubstituted alkyl or aryl,

n is an integer from 1 to 3,

each m is a member, selected independently from the group consisting of hydrocarbon of 1 to 20 carbon atoms, —RO—H and —RO— $P(OR')_{3-n}$, wherein R, R', n and x are as above described, and z is 0 or 1, providing that when z is 0,

is hydrogen.

4,006,118
FLAME-RETARDANT THERMOPLASTIC POLYMER COMPOSITIONS

Yoshikatsu Ogawa, Takatsuki; Takeshi Kasahara, Sakai, and Haruhiko Hisada, Yao, all of Japan, assignors to Marubishi Yuka Kogyo Kabushiki Kaisha and Mitsubishi Petrochemical Company Limited, both of, Japan

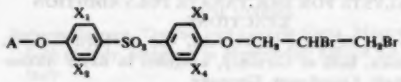
Continuation-in-part of Ser. No. 264,778, June 21, 1972, abandoned. This application May 4, 1973, Ser. No. 357,189

Claims priority, application Japan, July 28, 1971, 46-56044; Oct. 15, 1971, 46-80927

Int. Cl.² C08K *5/59, 5/41*

U.S. Cl. 260—45.75 B **10 Claims**

1. A flame-retardant thermoplastic polymer composition comprising at least one thermoplastic polymer derived from an ethylenically unsaturated monomer and from 0.1 to 20%, based on the weight of the thermoplastic polymer, of at least one specific brominated alkoxydiphenyl sulfone derivative of the formula (I):



(I)

wherein A is a member selected from the group consisting of a hydrogen atom and allyl, propyl, 2,3-dichloropropyl and 2,3-dibromopropyl groups, and X_1, X_2, X_3 and X_4 are members selected from the group consisting of chorine and bromine atoms with at least two of them being bromine atom.

4,006,119
STABILIZED EPIHALOHYDRIN POLYMERS

Howard C. Beadle, and Irving Gibbs, both of Norwalk, Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Filed Sept. 17, 1975, Ser. No. 614,146

Int. Cl.² C08K *5/39*

U.S. Cl. 260—45.75 N **12 Claims**

1. A composition having improved aging resistance comprising a polymer selected from the group consisting of a homopolymer of epihalohydrin and copolymers of epihalohydrin with an epoxide and a sufficient amount of a nickel (II) salt of a branched-chain dialkyldithiocarbamate having 3 to 5 carbon atoms in each alkyl group to impart said improved aging resistance to the composition.

4,006,120
THERMOSTABLE POLYESTER

Erich Behr, Troisdorf, and Wolfgang Wolfes, Bergheim, Sieg, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

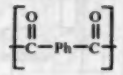
Continuation-in-part of Ser. No. 244,239, April 14, 1972, abandoned, which is a continuation of Ser. No. 33,968, May 1, 1970, abandoned. This application June 5, 1974, Ser. No. 476,761

Claims priority, application Germany, May 27, 1969, 1926843

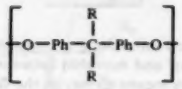
Int. Cl.² C08G *63/18*

U.S. Cl. 260—47 C **8 Claims**

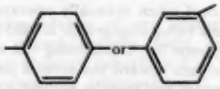
1. A process for the preparation of a thermostable polyester having an intrinsic viscosity of 0.8 to 1.4 determined in a 0.5% by weight solution in o-dichlorobenzene at 20° C which polymer is insoluble in tetrachloroethane and consists of about 40 to 200 units, said polymer having units of the formula



combined with units of the formula



wherein Ph is



and both R radicals are methyl on some units and both R radicals are phenyl on the balance of the units, said methyl units comprising 5 to 30 mol percent of the total R-containing units which comprises heating and condensing in the absence of a catalyst a mixture of 2,2-bis-(4-hydroxyphenyl)-propane and 4,4'-dihydroxytetraphenyl-methane having a melting point of at least 300° C together with a compound supplying an isophthalyl or terephthalyl moiety until there is prepared said polyester which is insoluble in tetrachloroethane.

4,006,121
DOOR LATCH MECHANISM CONTROLLING SWITCH IN MICROWAVE OVEN OR THE LIKE

Tatsuji Isono, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed June 24, 1974, Ser. No. 482,654

Claims priority, application Japan, June 27, 1973, 48-77025[U]; June 27, 1973, 48-77026[U]

Int. Cl.³ H01H *3/16, 9/20;* **H05B** *9/06*

U.S. Cl. 200—61.64 **14 Claims**

1. A latch mechanism for latching a door structure to a casing, comprising in combination a latch member movable with the door structure,

a support member fixedly mounted on the casing,

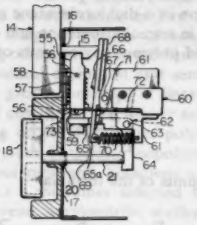
catch means supported on the support member and having a first position engageable with the latch member for latching the door structure to the casing and a second position engageable with the latch member for maintaining the door structure unlatched from the casing,

resilient biasing means responsive to movement of the catch means between the first and second positions thereof and operative to bias the catch means toward the first position when the catch means is moved toward and into the first

position thereof and to bias the catch means toward the second position when the catch means is moved toward and into the second position,

electric switch means having a closed condition responsive to the movement of the catch means into the first position thereof and an open condition responsive to the movement of the catch means toward the second position thereof,

leverage linkage means which is engageable at one end with said catch means and at the other end with said electric switch means for amplifying and transmitting the movement of the catch means to the first or second position thereof to the switch means, and



manually-operated unlatching means responsive to the first position thereof and movable between a first position to allow the catch means to stay in the first position thereof and a second position to hold the catch means out of the first position thereof, said unlatching means being held in the first position thereof when the catch means is in the first position thereof and being moved to the second position thereof when manually operated, said leverage linkage means being engageable at said one end with the unlatching means for transmitting the movement of the unlatching means toward the second position thereof to the switch means and thereby actuating the switch means into said open condition when the unlatching means is manually moved into the second position thereof.

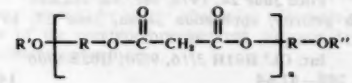
4,006,122
POLYESTER-AMIDES PREPARED FROM POLYMALONATES AND ISOCYANATES

Augustin T. Chen, Hamden, and William J. Farrissey, Jr., Northford, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Mar. 11, 1974, Ser. No. 449,938
Int. Cl.² C08G *18/34, 18/42*
U.S. Cl. 260—75 TN **26 Claims**

1. A poly(ester-amide) which is the product of reacting, in the presence of a basic catalyst,

a. a polymalonate having the formula



wherein *n* is an integer from 1 to 20, R is the hydroxyl-free residue of a diol selected from the class consisting of alkanediols, cycloalkanediols, poly(alkylene glycols), di(hydroxyalkyl)ethers of dihydric phenols, and bis(hydroxyphenyl)alkanes, and R′ and R″ are independently selected from the class consisting of hydrogen, hydrocarbylcarbamoyl, and the acyl radical of a hydrocarbon monocarboxylic acid; and

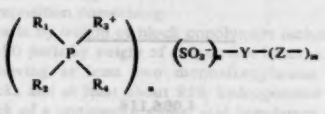
b. an organic polyisocyanate in an amount such that there is at least one isocyanate group for each hydroxy group, if any, present in the polymalonate and there is also at least one isocyanate group for each molecule of polymalonate.

4,006,123
CONDUCTIVE ALIPHATIC POLYESTER OR POLYETHERESTER HAVING UNITS CONTAINING PHOSPHONIUM SULFONATE GROUPS

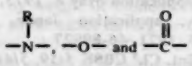
Harry Vaughn Samuelson, Wilmington, and Gurdial Singh, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 403,221, Oct. 3, 1973, abandoned. This application Feb. 25, 1975, Ser. No. 552,867
Int. Cl.² C08G *63/68*
U.S. Cl. 260—75 P **5 Claims**

1. A conductive aliphatic polyester of polyetherester having a glass transition temperature measured by nuclear magnetic resonance peak ratio of less tnan 25° C, a log R_s of less than 10 and having units containing phosphonium sulfonate groups of the formula



where R_1, R_2, R_3 and R_4 represents monovalent hydrocarbon groups with the proviso that R_1 and R_2 may jointly represent an alkylene group, Y is a divalent hydrocarbon group of up to 24 carbon atoms in which any unsaturation is aromatic and which may be interrupted by oxygen, sulfonamide or sulfonyl groups, Z is selected from the group consisting of



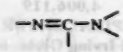
wherein R is hydrogen or an alkyl group of 1–18 carbon atoms and *n* and *m* are 1 or 2, said groups being present in an amount of from 0.01 mol % to about 50 mol % based on the total mols of dicarboxylic acid units and/or hydroxycarboxylic acid units in the polymer chain.

4,006,124
AMIDINE-METAL COMPLEXES AND THEIR USE AS CATALYSTS FOR ISOCYANATE POLYADDITION REACTIONS

Rainer Welte, Bensberg-Herkenrath, and Gerhard Grögler, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 26, 1975, Ser. No. 590,768
Claims priority, application Germany, July 16, 1974, 2434185
Int. Cl.² C08G *18/00*
U.S. Cl. 260—77.5 AC **4 Claims**

1. In a process of producing a polyurethane by reacting a polyisocyanate, and at least one active hydrogen containing compound in the presence of a catalyst the improvement wherein the catalyst is a complex formed by mixing amidines containing the characteristic group



with 0.5 to 4 times the molar quantity of a metal compound corresponding to the formula

MeX_nY_m

in which

Me represents an $(n + m)$-valent metal,

X represents an aliphatic hydrocarbon radical with 1 to 18 carbon atoms, an aromatic hydrocarbon radical with 6 to 10 carbon atoms, or an araliphatic hydrocarbon radical with 7 to 15 carbon atoms,

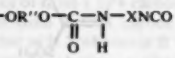
Y represents an aliphatic C_1–C_{18}-carboxylate anion with a single negative charge and optionally containing olefinic double bonds and/or alcoholic hydroxyl groups, or a C_5–C_{18}-enolate anion carrying a single negative charge,
$n = 0$ to 2,
$m = 0$ to 4 with the proviso that $n + m$ together =2 to 4.

4,006,125
CURABLE POLYPHOSPHAZENES

Kennard A. Reynard, Mentor, and Arthur H. Gerber, University Heights, both of Ohio, assignors to Horizons Incorporated a division of Horizons Research Incorporated, Cleveland, Ohio

Continuation of Ser. No. 504,740, Sept. 10, 1974, abandoned. This application July 21, 1975, Ser. No. 597,748
Int. Cl.² C08G *18/00*
U.S. Cl. 260—77.5 AQ **8 Claims**

1. A curable linear polyphosphazene composition which can be crosslinked at room temperature and above in the presence of moisture comprising a polyphosphazene which consists of randomly repeating substituents attached to the phosphorus atoms of a —P=N— backbone, said substituents being represented by the general formulae —OR and OR′, wherein each OR represents a monovalent member selected from the group consisting of alkoxy, polyfluoroalkoxy, aryloxy, arylalkoxy, and substituted derivatives thereof and all of the OR groups are not required to be identical, and each OR′ represents the group

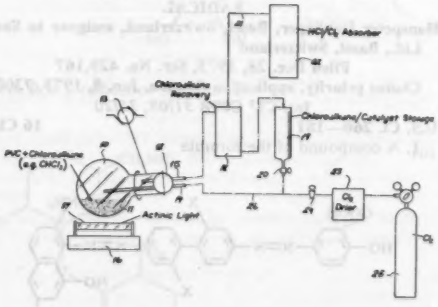


wherein R″ is a divalent alkylene or arylalkylene group and all the R″ groups are not required to be the same and X is a divalent arylene or alkylene group;
the degree of polymerization of said polyphosphazene being from 10 to about 50,000.

4,006,126
PROCESS FOR THE CHLORINATION OF VINYL POLYMERS

Roberto Rettore, Treviso, and Giorgio Gatta, Mestre (Venice), both of Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Continuation of Ser. No. 616,053, Feb. 14, 1967, abandoned. This application Feb. 17, 1970, Ser. No. 12,896
Claims priority, application Italy, Feb. 16, 1966, 14558/66
Int. Cl.² C08F *8/20*
U.S. Cl. 526—17 **14 Claims**



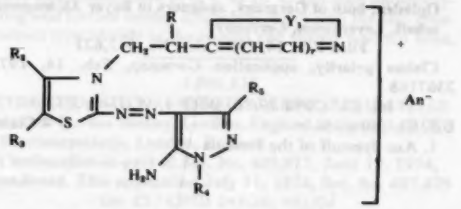
1. A process for chlorinating a vinyl-chloride polymer in a powdered state, comprising the steps of:
mixing the powder with a least one liquid chloroalkane present in an amount ranging between 10 and 55 parts by volume in cm^3 per 100 parts by weight in grams of said polymer and under substantially anhydrous conditions with at most 0.2% by weight H_2O; and
subjecting the resulting substantially anhydrous mixture in powder form to treatment with gaseous chlorine while catalytically activating the system at a temperature below the vitreous-transition temperature of the polymer.

4,006,127
CATIONIC DIAZACYANINE DYESTUFFS

Roderich Raue, Leverkusen, and Hans-Lothar Dorsch, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

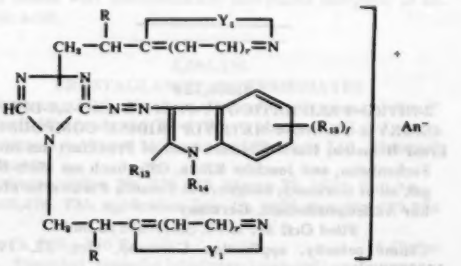
Filed Oct. 5, 1973, Ser. No. 403,790
Claims priority, application Germany, Oct. 5, 1972, 2248738
Int. Cl.² C09B *43/00*
U.S. Cl. 260—146 R **17 Claims**

1. Dyestuff of the formula



wherein
R_2 and R_3 independently of one another are hydrogen, C_1–C_4-alkyl, phenyl, halogen, nitro, cyano, thiocyano, C_1–C_4-alkoxy, phenoxy, benzyloxy, C_1–C_4-alkylmercapto, C_1–C_4-alkylsulphonyl, aminosulphonyl, acetyl, benzoyl, acetylamino, benzoylamino, C_1–C_4-alkylsulphonylamino, C_1–C_4-alkoxycarbonyl, phenoxycarbonyl, aminocarbonyl or carboxyl; or
R_2 and R_3 taken together form a cyclohexene or benzene ring which is unsubstituted or substituted by R_5;
R_4 is hydrogen, C_1–C_4-alkyl, phenyl, cyclohexyl or benzyl;
R_5 is hydrogen, C_1–C_4-alkyl or C_1–C_4-alkoxy; Y_1 together with C=(CH-CH)$_r$=N forms pyridine, quinoline, imidazole, benzimidazole, thiazole, benzthiazole or pyrimidine ring, which ring is unsubstituted or substituted by one or two members selected from the group consisting of methyl, methoxymethyl, ethyl, phenyl and dimethylamino;
R is hydrogen or alkyl of 1 to 4 carbon atoms; $An^{(-)}$ is an anion; and
r is 0 or 1.

6. Dyestuff of the formula



wherein
R is hydrogen or C_1–C_4-alkyl;

Y_1 together with C–(CH–CH)$_r$=N forms pyridine, quinoline, imidazole, benzimidazole, thiazole, benzthiazole or pyrimidine ring, which ring is unsubstituted or substituted by one or two members selected from the group consisting of methyl, methoxymethyl, ethyl, phenyl and dimethylamino;

An $^{(-)}$ is an anion;

r is 0 or 1;

R_{13} is C_1–C_6-alkyl, phenyl or benzyl;

R_{14} is hydrogen, C_1 –C_6-alkyl or C_3–C_6-alkenyl or C_3–C_6-alkinyl, benzyl or phenylethyl;

R_{15} is hydrogen, C_1–C_4-alkyl, C_1–C_4-alkoxy or halogen; and

f is 1 or 2.

4,006,128

AZO DYESTUFFS CONTAINING AMINOPYRIDONE COUPLING COMPONENT

Karl-Ludwig Moritz, Cologne, and Karl-Heinz Schündehütte, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

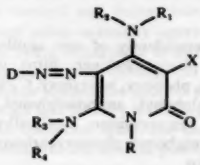
Filed Feb. 14, 1974, Ser. No. 442,621

Claims priority, application Germany, Feb. 14, 1973, 2307168

Int. Cl.² C09B *29/36;* **D06P** *1/08, 3/46, 3/52*

U.S. Cl. 260—156 **4 Claims**

1. Azo dyestuff of the formula



in which

D is the radical of a diazo component;

R is C_1–C_6-alkyl; C_1–C_6-alkyl substituted by halogen, cyano, hydroxyl, C_1–C_4-alkoxy or C_2–C_5-alkoxycarbonyl; cyclohexyl; cyclohexyl substituted by methyl; phenyl; phenyl substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen or cyano; benzyl; phenethyl; or benzyl or phenethyl substituted by chlorine, C_1–C_4-alkyl or C_1–C_4-alkoxy;

X is cyano

R_1–R_4 are hydrogen; C_1–C_6-alkyl; C_1–C_6-alkyl substituted by halogen, cyano, hydroxyl, C_1–C_4-alkoxy or C_2–C_5-alkoxycarbonyl; benzyl; phenethyl; or benzyl or phenethyl substituted by chlorine, C_1–C_4-alkyl or C_1–C_4-alkoxy.

4,006,129

2-NITRO-4-ALIPHATICOXY-PHENYL-AZO-2,6-DIHYDROXY-3-CYANO-4-METHYLPYRIDINE COMPOUNDS

Ernst Heinrich; Horst Kindler, both of Frankfurt am Main-Fechenheim, and Joachim Ribka, Offenbach am Main-Bürgel, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

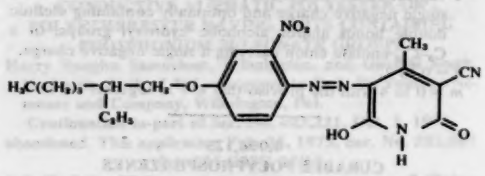
Filed Oct. 21, 1974, Ser. No. 516,360

Claims priority, application Germany, Oct. 22, 1973, 2352858

Int. Cl.² C09B *29/36*

U.S. Cl. 260—156 **1 Claim**

1. The water-insoluble monoazo dye of the formula



4,006,130

TRISAZO DYESTUFFS CONTAINING ETHERIFIED OR ESTERIFIED HYDROXYL GROUPS

Reiner Ditzer, Odenthal-Vois-winkel, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

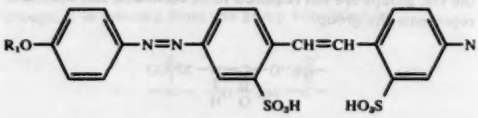
Filed Dec. 6, 1974, Ser. No. 530,443

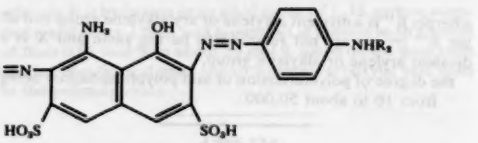
Claims priority, application Germany, Dec. 6, 1973, 2360708

Int. Cl.² C09C *31/18;* **D06P** *1/06, 3/00, 3/60*

U.S. Cl. 260—173 **1 Claim**

1. Polyazo dyestuff which in the form of the free acid corresponds to the formula





wherein

R_1 is C_1–C_4 -alkyl; and

R_2 is C_2–C_5-alkylcarbonyl or benzoyl wherein said benzoyl is unsubstituted or substituted in the benzene nucleus by methyl, methoxy, chlorine, nitro, or sulpho.

4,006,131

ANIONIC DIASAZO DYES HAVING A 2,2'-DIHALODIPHENYL TETRAZO COMPONENT RADICAL

Hanspeter Uehlinger, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

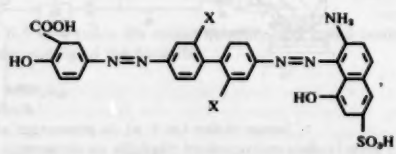
Filed Dec. 28, 1973, Ser. No. 429,167

Claims priority, application Sweden, Jan. 8, 1973, 7300144

Int. Cl.² C09B *31/08, 35/20*

U.S. Cl. 260—181 **16 Claims**

1. A compound of the formula



or a salt thereof, wherein each X is independently fluoro, chloro or bromo.

4,006,132
1'-FORMYL-1'-HALOBENZENEAZOMETHANE COMPOUNDS HAVING HERBICIDAL ACTIVITY

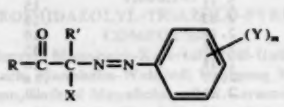
Malcolm W. Moon, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 468,768, May 10, 1974, abandoned, which is a division of Ser. No. 138,338, April 28, 1971, Pat. No. 3,830,642. This application Nov. 14, 1975, Ser. No. 631,865

Int. Cl.² A01N 9/24; C07C 107/04

U.S. Cl. 260—192 41 Claims

1. A compound of the structural formula:



wherein R is alkyl of from 1 to 8 carbon atoms, inclusion; alkoxy of from 1 to 8 carbon atoms, inclusive; haloalkoxy of from 1 to 8 carbon atoms, inclusive; cycloalkyl of from 3 to 8 carbon atoms, inclusive; cycloalkoxy of from 3 to 8 carbon atoms, inclusive; or haloalkyl of from 1 to 8 carbon atoms, inclusive; R' is lower-alkyl of from 1 to 8 carbon atoms, inclusive, phenyl, cycloalkyl of from 3 to 8 carbon atoms, inclusive; or X; X is bromine, chlorine, or fluorine; *m* is an integer 0 through 5, inclusive, and Y is (independently when m is more than 1) halogen, lower-alkyl of from 1 to 4 carbon atoms, inclusive, lower-alkoxy of from 1 to 4 carbon atoms, inclusive, or halolower-alkyl of from 1 to 4 carbon atoms, inclusive; providing however, that *m* is 2 whenever R' is X, and that the sum of the carbon atoms in substituents (Y)m is not more than 15.

4,006,133
AMINOGLYCOSIDE ANTIBIOTICS

Eiji Ohki, Ichikawa; Hiromichi Saeki, Yamato, and Shinichi Sugawara, Tokyo, all of Japan, assignors to Sankyo Company Limited, Japan

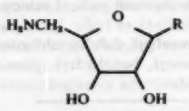
Filed Oct. 18, 1974, Ser. No. 515,814

Claims priority, application Japan, Oct. 25, 1973, 48-120325

Int. Cl.² C07G 11/00

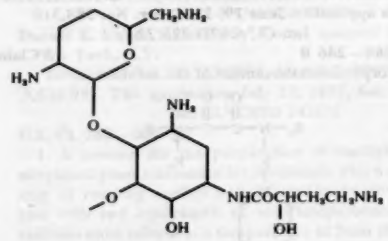
U.S. Cl. 536—17 5 Claims

1. Compounds having the formula (I):



(I)

wherein R is a radical of formula (II):



(II)

4,006,134
CALCIUM SUGAR PHOSPHATES

John Whetstone, Woodlea, Scotland, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 392,488, Aug. 29, 1973, abandoned, which is a division of Ser. No. 177,980, Sept. 7, 1971, Pat. No. 3,782,901. This application Jan. 9, 1976, Ser. No. 647,981

Claims priority, application United Kingdom, Sept. 7, 1970, 42763/70

Int. Cl.² C08B 37/00

U.S. Cl. 536—117 8 Claims

1. In a process for the manufacture of a phosphoric acid ester of a polyhydric alcohol by cooling an aqueous solution or slurry of a polyhydric alcohol and an inorganic calcium oxy-compound to a temperature between 0° and 10° C. and then phosphorylating the cooled solution or slurry with phosphorous oxychloride, the improvement comprising circulating the solution or slurry around a closed loop reaction system which includes a cooling zone and a cooled and stirred reaction zone, cooling said circulating solution or slurry by circulation through the cooling zone to reduce the temperature thereof to near 10° C., then further cooling said circulating solution or slurry to a temperature of 0° C to 10° C and then phosphorylating said further cooled solution or slurry with the said phosphorous oxychloride in the cooled and stirred reaction zone.

4,006,135
HYDROXYMETHYL BENZODIAZEPINE DERIVATIVES

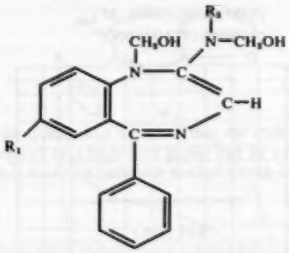
Umakant Devdas Shenoy, London, England, assignor to DDSA Pharmaceuticals, London, England

Continuation-in-part of Ser. No. 480,917, June 19, 1974, abandoned. This application July 11, 1974, Ser. No. 487,479

Int. Cl.² C07D 243/20, 401/04

U.S. Cl. 260—239 BD 7 Claims

1. A benzodiazepine derivative of the formula



wherein

R_1 is a radical selected from the group consisting of hydrogen, halogen, trifluoromethyl, cyano, nitro, lower alkyl, lower alkoxy and lower alkylthio; and

R_2 represents a lower alkyl radical;

four oxides thereof and acid addition salts thereof and of the four oxides with therapeutically acceptable inorganic or organic acids.

4,006,136
PROSTAGLANDIN INTERMEDIATES

Nedumparambil A. Abraham, Dollard des Ormeaux; Jehan F. Bagli, Kirkland, and Tibor Bogri, Montreal, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Division of Ser. No. 238,650, March 27, 1972, Pat. No. 3,849,474. This application July 19, 1974, Ser. No. 489,856

Int. Cl.² C07C 69/74

U.S. Cl. 260—240 R 6 Claims

1. Dimethyl trans-2-(3-hydroxy-1-octenyl)-cyclopropane-1,1-dicarboxylate.

3. Dimethyl and diethyl trans-2-(3-oxo-1-octenyl)cyclopropane-1,1-dicarboxylate.

4. Diethyl trans-3-(acetoxymethyl)-2-(3-oxo-1-octenyl)-cyclopropane-1,1-dicarboxylate.

5. Diethyl trans-3-(acetoxymethyl)-2-(3-hydroxy-1-octenyl)cyclopropane-1,1-dicarboxylate.

4,006,137

2-ETHENYL IMIDAZOLIUM DERIVATIVES

Rudiger D. Haugwitz, and Barbara V. Maurer, both of Titusville, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 21, 1975, Ser. No. 606,387
Int. Cl.² C07D *233/06, 403/06*
U.S. Cl. 260—240 D **8 Claims**

1. A compound selected from the group consisting of 2-[2-(4-methoxyphenyl)ethenyl]-1,3-dimethyl-1H-imidazolium iodide; 1,3-dimethyl-2-[2-(2-pyridinyl)ethenyl]-1H-imidazolium iodide; 1,3-dimethyl-2-[2-(1-methyl-1H-pyrrol-2-yl)ethenyl]-1H-imidazolium iodide; 1,3-dimethyl-2-[2-(2-furanyl)ethenyl]-1H-imidazolium iodide; 2-[2-(4-chlorophenyl)ethenyl]-1,3-dimethyl-1H-imidazolium iodide; 1,3-dimethyl-2-[2-(2-thienyl)-ethenyl]-1H-imidazolium iodide; and 1,3-dimethyl-2-[2-(1-naphthalenyl)ethenyl]-1H-imidazolium iodide.

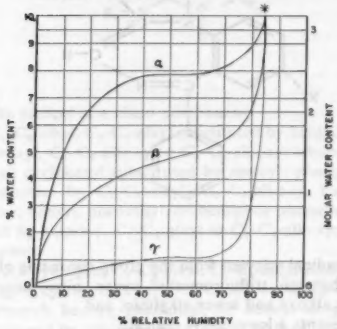
4,006,138

CRYSTALLINE FORM OF SODIUM O-FORMYLCEFAMANDOLE

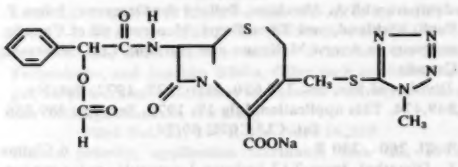
Kuo S. Yang, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 11, 1975, Ser. No. 567,324
Int. Cl.² C07D *501/60*
U.S. Cl. 260—243 C **1 Claim**

WATER SORPTION ISOTHERMS
CRYSTALLINE FORMS OF
O-FORMYLCEFAMANDOLE



1. The crystalline anhydrate form of the compound of the formula



which has a melting point of 190°±1° C. and which has the following X-ray powder diffraction pattern obtained with nickel filtered copper radiation of γ1.5405 wherein d represents the interplanar spacings and I/I_1 the relative intensities:

d	I/I_1
17.80	.30
11.76	.30
9.39	.10
7.49	.70
7.18	.20
6.20	.15
5.52	.40
5.00	.40
4.74	.20
4.54	.80
4.20	.50
3.98	.10
3.72	1.00
3.51	.05
3.32	.02
3.06	.10
2.91	.15
2.83	.15
2.75	.10
2.56	.05
2.36	.10
2.17	.10
2.11	.10

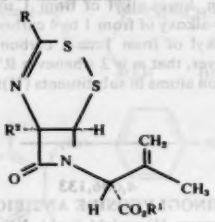
4,006,139

1,2,4-DITHIAAZ-3-ENES

Ronald G. Micetich; Clinton G. Chin, and Robert B. Morin, all of Edmonton, Canada, assignors to Connlab Holdings Limited, Willowdale, Canada

Filed Apr. 24, 1975, Ser. No. 571,427
Claims priority, application Canada, Aug. 30, 1974, 208248
Int. Cl.² C07D *285/00*
U.S. Cl. 260—243 R **21 Claims**

1. A compound of the formula:



wherein R stands for
benzyl,
phenoxymethyl,
4-amino-4-carboxy-1-butyl,
R^3O—, R^3S—, R^3R^4N—wherein
R^3 is loweralkyl, phenyl or phenylloweralkyl,
R^4 is hydrogen or R^3, and
OH when the radicals R^3O—, R^3S— and R^3R^4N— are hydrolyzed;
R^2 is hydrogen or methoxy, and
R^1 is hydrogen or a clevable radical selected from the following:
$-CH_2OCH_2$, loweralkyl, 2,2,2-trichloroethyl,
benzyl, p-nitrobenzyl, benzhydryl, phenoxyethyl or trimethylsilyl.

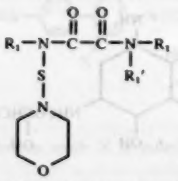
4,006,140

MORPHOLINOTHIO OXAMIDES

Pyong-Nae Son, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

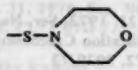
Division of Ser. No. 367,642, June 6, 1973, Pat. No. 3,910,864. This application June 19, 1975, Ser. No. 588,310
Int. Cl.² C07D *295/22*
U.S. Cl. 260—246 B **3 Claims**

1. A morpholinothiooxamide of the formula



wherein R_1 is selected from the group consisting of hydrogen,

alkyl radicals containing 1 to about 12 carbon atoms, a phenyl radical, and a cyclohexyl radical, and R_1' is the same as R_1 or is the group



4,006,141

NITROIMIDAZOLYL-TRIAZOLO-PYRIDAZINE COMPOUNDS

Herbert Berger, Mannheim-Kafertal; Rudi Gall, Grossachsen; Kurt Stach, Mannheim-Waldhof; Wolfgang Vomel, and Rita Hoffmann, both of Mannheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

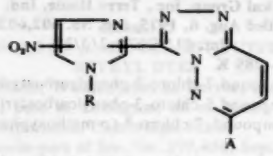
Division of Ser. No. 336,099, Feb. 26, 1973, Pat. No. 3,928,349. This application July 31, 1975, Ser. No. 601,116

Claims priority, application Germany, Apr. 1, 1972, 2215999

Int. Cl.² C07D *487/04*

U.S. Cl. 260—250 AC **10 Claims**

1. Nitroimidazolyl-triazolo-pyridazine compound of the formula



wherein

R is hydrogen, lower alkyl, 2-hydroxy-alkyl, 2-alkanoyloxy-alkyl, or 2-alkoxyalkyl, wherein the alkyl moieties contain up to 6 carbon atoms;

A is hydrogen, halogen, azido, cyano, alkyl, alkoxy, alkylthio, alkylsulfonyl, carboxyl, alkoxycarbonyl, alkoxycarbonimidoyl, hydrazino, carbamoyl, amidino, carboximidohydrazide, hydrazino substituted by one or two alkanoyl, alkyl or cycloalkyl radicals, carbamoyl substituted by one or two alkanoyl, alkyl or cycloalkyl radicals, amidino substituted on the amino nitrogen by one or two alkanoyl, alkyl or cycloalkyl radicals, or carboximidohydrazide substituted on the terminal amino nitrogen by one or two alkanoyl, alkyl or cycloalkyl radicals; wherein the alkyl radicals or containing moieties are of no more than 6 atoms each,

and the pharmacologically acceptable salts thereof.

4,006,142

PREPARATION OF METHYL-3-(2-QUINOXALINYLMETHYLENE)CARBAZATE-N¹,N⁴-DIOXIDE

Donald E. Kuhla, Gales Ferry, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 338,906, March 7, 1973, Pat. No. 3,926,991. This application July 18, 1975, Ser. No. 597,209

Int. Cl.² C07D *241/52*

U.S. Cl. 260—250 QN **2 Claims**

1. A process for the preparation of methyl-3-(2-quinoxalinylmethylene)carbazate N^1,N^4-dioxide which comprises the step of reacting methyl-3-(2-quinoxalinylmethylene) carbazate with two equivalents of m-chloroperbenzoic acid in a reaction inert solvent at a temperature of from about 20° up to 100° C. until reaction is substantially complete.

4,006,143

HETEROCYCLIC SUBSTITUTED PYRIMIDINE COMPOUNDS

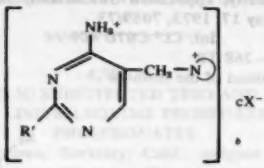
Edward F. Rogers, Middletown; John Hannah, Matawan, both of N.J., and Richard A. Dybas, Center Square, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 459,501, April 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 224,620, Feb. 8, 1972, abandoned. This application Oct. 16, 1975, Ser. No. 623,211

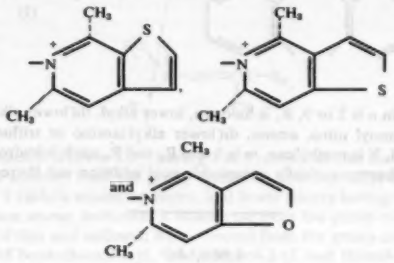
Int. Cl.² C07D *401/14*

U.S. Cl. 260—256.4 N **9 Claims**

1. A compound having the following formula:



wherein R' is alkyl having 1 to 3 carbon atoms; X^- is a non-toxic anion; *b* and *c* are integers such that the positive charge of *b* moles of cation are neutralized by *c* moles of anion X^-; and -N⟨ ⟩ is a member of the group consisting of:



wherein the dotted line indicates that the alpha methyl group can be present or a hydrogen group can be present, with the proviso that one and only one methyl group is present.

4,006,144

10,11-DIHYDRO-DIBENZO(b,f)THIEPIN DERIVATIVES

Max Gerecke, Reinach; Jean-Pierre Kaplan, Bubendorf, and Emilio Kyburz, Reinach, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

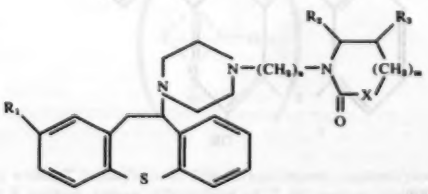
Division of Ser. No. 378,730, July 12, 1973, Pat. No. 3,929,791. This application Oct. 3, 1975, Ser. No. 619,149

Claims priority, application Switzerland, July 21, 1972, 1001/72; May 17, 1973, 7059/73

Int. Cl.² C07D *409/14*

U.S. Cl. 260—268 TR **3 Claims**

1. A compound of the formula



(I)

wherein n is 2 or 3, R_1 is halogen, lower alkyl, di(lower alkyl)-sulphamoyl, nitro, amino, di(lower alkyl)-amino or trifluoro-

methyl, X is methylene, m is zero and R_2 and R_3 each is hydrogen, or a pharmaceutically acceptable acid addition salt thereof.

4,006,145

10,11-DIHYDRO DIBENZO(b,f)THIEPIN DERIVATIVES

Max Gerecke, Reinach; Jean-Pierre Kaplan, Bubendorf, and Emilio Kyburz, Reinach, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

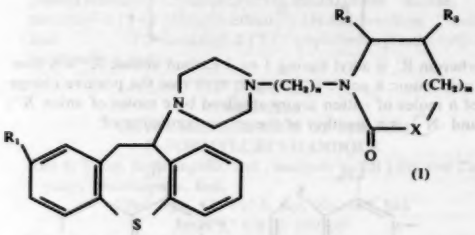
Division of Ser. No. 378,730, July 12, 1973, Pat. No. 3,929,791. This application Oct. 3, 1975, Ser. No. 619,169

Claims priority, application Switzerland, July 21, 1972, 11001/72; May 17, 1973, 7059/73

Int. Cl.² C07D *409/14*

U.S. Cl. 260—268 TR **2 Claims**

1. A compound of the formula



(I)

wherein *n* is 2 or 3, R_1 is halogen, lower alkyl, di(lower alkyl)-sulphamoyl nitro, amino, di(lower alkyl)amino or trifluoromethyl, X is methylene, *m* is 1 and R_2 and R_3 each is hydrogen or a pharmaceutically acceptable acid addition salt thereof.

4,006,146

5-AZA-7-THIADIBENZOCRYSENE DERIVATIVES

Gioacchino Boffa, and Nicola Mazzaferro, both of Novara, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

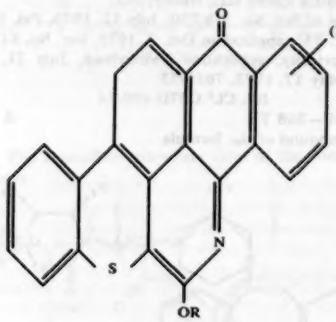
Filed Jan. 10, 1975, Ser. No. 540,166

Claims priority, application Italy, Jan. 11, 1974, 19331/74

Int. Cl.² C09B *5/02*

U.S. Cl. 260—272 **3 Claims**

1. As new compounds, 14H-5-aza-7-thiadibenzo-[b,def]-crysenes corresponding to the general formula:



wherein:

X = chlorine

n = zero or 1.0

R = a lower alkyl radical.

4,006,147

TETRACHLOROETHOXYETHYL ESTERS AND METHOD FOR THEIR PREPARATION

Frantisek Hrabak, and Karel Bochal, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

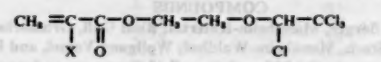
Filed Dec. 21, 1973, Ser. No. 427,224

Claims priority, application Czechoslovakia, Dec. 28, 1972, 9028/72; Dec. 28, 1972, 9029/72

Int. Cl.² C07C *69/54*

U.S. Cl. 260—486 H **1 Claim**

1. Tetrachloroethyoxyethyl esters of the general formula



(I)

where X is a hydrogen atom or CH_3 radical.

4,006,148

CARBOSTYRIL DERIVATIVES USED AS COCCIDIOSTATS

Herbert Louis Wehrmeister, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Aug. 6, 1975, Ser. No. 602,602

Int. Cl.² C07D *215/22*

U.S. Cl. 260—289 K **4 Claims**

1. The compound 7-chloro-3-phenylcarbostyril.

2. The compound 5-chloro-3-phenylcarbostyril.

3. The compound 7-chloro-3-(p-methoxyphenyl) carbostyril.

4. The compound 7-chloro-3-(2,4-dichlorophenoxy) carbostyril.

4,006,149

CATALYTIC PRODUCTION OF PYRIDINES FROM ALKYNES AND NITRILES

Helmut Bonnemann, Essen (Ruhr), and Hartmut Schenkluhn, Mulheim (Ruhr), both of Germany, assignors to Studiengesellschaft Kohle M.b.H., Mulheim (Ruhr), Germany

Filed Apr. 2, 1975, Ser. No. 564,392

Claims priority, application Germany, Apr. 4, 1974, 2416295

Int. Cl.² C07D *213/08*

U.S. Cl. 260—290 P **7 Claims**

1. In the cocyclization of an alkyne selected from the group consisting of acetylene, lower alkyl acetylene, phenyl-acetylene, lower alkoxy-acetylene and lower alkoxy-lower alkyl-acetylene and a nitrile selected from the group consisting of lower alkyl nitrile, phenyl nitrile, phenyl-lower alkyl nitrile and lower alkenyl nitrile in the presence of a cobalt complex compound as catalyst to form a pyridine ring compound, the improvement which comprises employing as said catalyst a member selected from the group consisting of

a. a catalyst obtained by reducing a divalent or trivalent cobalt salt in the presence of at least one of the alkyne or nitrile reactants, employing as the reducing agent a metal or organometallic compound wherein the metal is zinc, cadmium or a metal of the main Groups I to III of the Periodic Table of elements, or

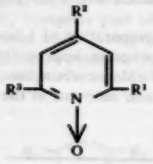
b. a cobalt-(I) diene complex of the type cyclooctenyl-cobalt(I)-cyclooctadiene, methyl heptadienyl-cobalt(I)-butadiene and cyclopentadienyl-cobalt(I)-cyclooctadiene.

4,006,150
ALKYLSULFONYL METHYL-SUBSTITUTED PYRIDINE N-OXIDES

Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 31, 1976, Ser. No. 672,291
Int. Cl.² C07D 213/34
U.S. Cl. 260—294.8 F 8 Claims

1. A compound of the formula



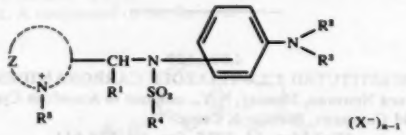
wherein R^1 is hydrogen or $-CH_2SO_2R$ wherein R is lower alkyl having 1 to 4 carbon atoms; R^2 is hydrogen, lower alkyl having 1 to 4 carbon atoms or said $-CH_2SO_2R$ and R^3 is hydrogen or lower alkyl having 1 to 4 carbon atoms, at least one of said R^1 and R^2 being $-CH_2SO_2R$.

4,006,151
PRECURSORS OF β-AZA-DISUBSTITUTED AMINO STYRYL DYES

Stanley M. Bloom, Waban; Alan L. Borror, and Richard B. Greenwald, both of Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 399,456, Sept. 21, 1973, abandoned, Division of Ser. No. 261,270, June 9, 1972, Pat. No. 3,794,465. This application June 25, 1975, Ser. No. 590,144
Int. Cl.² C07D 213/34
U.S. Cl. 260—294.8 F 9 Claims

1. A compound represented by the formula:



wherein R^1 is hydrogen or 1 to 4 carbon alkyl; R^2, R^3 and R^5 is 1 to 4 carbon alkyl; R^4 is 1 to 4 carbon alkyl or phenyl; Z, taken with N, represents the atoms necessary to make up pyridine radical; X is an acid anion; and n is 1 when R^5 carries a negative charge and 2 when R^5 is electrically neutral.

4,006,152
ε-N-PYRIDYL-4-METHYLOXYCARBONYLLYSINE

Daniel F. Veber, Ambler, and Ralph F. Hirschmann, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 393,351, Sept. 6, 1973, Pat. No. 3,950,348, which is a division of Ser. No. 214,384, Dec. 30, 1971, Pat. No. 3,780,015. This application Nov. 26, 1975, Ser. No. 635,465
Int. Cl.² C07D 213/55
U.S. Cl. 260—295 R 1 Claim

1. ε-N-pyridyl-4-methyloxycarbonyllysine.

4,006,153
ANTHELMINTIC BENZIMIDAZOLES WITH IMPROVED AQUEOUS STABILITY

Richard J. Bochis, East Brunswick, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 25, 1974, Ser. No. 518,139
Int. Cl.² C07D 417/04
U.S. Cl. 260—302 H 3 Claims

1. The triethylamine salt of 1-carboxymethyleneamino-5-isopropoxycarbonylamino-2-(4′-thiazolyl) benzimidazole.

2. The trimethylamine salt of 1-carboxymethyleneamino-5-isopropoxycarbonylamino-2-(4′-thiazolyl) benzimidazole.

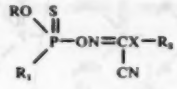
3. The diethylamine salt of 1-carboxymethyleneamino-5-isopropoxycarbonylamino-2-(4′-thiazolyl) benezimidazole.

4,006,154
HETEROCYCLIC SUBSTITUTED THIO AND SULFONYL GLYOXYLINITRILEOXIME PHOSPHATES AND PHOSPHONATES

Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 222,368, Jan. 31, 1972, Pat. No. 3,931,358. This application Aug. 18, 1975, Ser. No. 605,587
Int. Cl.² C07D 277/74, 277/36, 235/28
U.S. Cl. 260—302 E 11 Claims

1. A compound of the formula



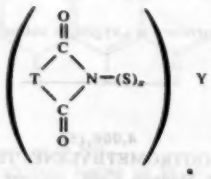
in which R is lower alkyl having 1 to 4 carbon atoms, inclusive; R_1 is selected from the group consisting of lower alkyl having 1 to 4 carbon atoms, inclusive, and lower alkoxy having 1 to 4 carbon atoms, inclusive; X is selected from the group consisting of thio and sulfonyl; R_2 is selected from the group consisting of benzothiazol-2-yl, benzimidazol-2-yl, and thiazol-2-yl.

4,006,155
METHOD FOR PREPARATION OF PHOSPHORUS POLYSULFIDES

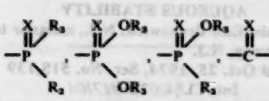
Alfred Bay Sullivan, Wadsworth, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 266,458, June 26, 1972, Pat. No. 3,859,297, and Ser. No. 880,893, Nov. 28, 1969, Pat. No. 3,705,923. This application Sept. 23, 1974, Ser. No. 508,047
Int. Cl.² C07D 277/78; C07F 9/62
U.S. Cl. 260—306.5 8 Claims

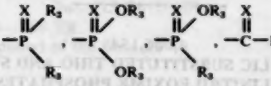
1. A process for the preparation of phosphorus polysulfides which comprises the step of reacting a compound Y′ $(SH)_{n'}$ with a compound



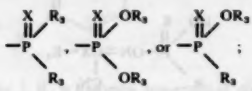
in which T is alkylene of 2–6 carbon atoms, cycloalkylene of 5–8 carbon atoms, alkenylene of 2–10 carbon atoms, cycloalkenylene of 5–8 carbon atoms, o-phenylene, or 2,5-naphthalene and n, n' and x are one or two; when n and n' are one, Y′ is



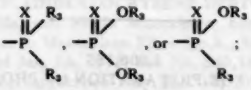
or $-R_3$ where R_3 is alkyl of 1–20 carbon atoms, cycloalkyl of 3–12 carbon atoms, hydrocarbyl aralkyl of 7–9 carbon atoms, alkenyl of 3–10 carbon atoms, phenyl, naphthyl, anthracenyl, or hydrocarbyl alkaryl of 7–10 carbon atoms and Y is



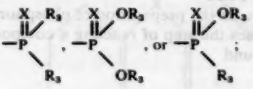
azolyl or nuclear mono-substituted azoalyl in which the substituents are selected from the group consisting of halo, hydroxy, lower alkoxy, nitro, lower alkyl, acetyl, lower alkanoyl, acetoxy, acetoxy lower alkyl, phenylcarbamoyl, and 2-mercapto-4,4,6-trimethyl-1(H) pyrimidinyl, or $-R_3$ with the proviso that at least one of Y and Y′ is



when n is two, n' is one and Y is alkylene of 2–6 carbon atoms, cycloalkylene of 5–8 carbon atoms, alkenylene of 2–10 carbon atoms, alkenylene of 5–8 carbon atoms, phenylene or naphthalene and Y′ is



when n' is two, n is one and Y′ is alkylene of 2–6 carbon atoms, cycloalkylene of 5–8 carbon atoms, alkenylene of 2–10 carbon atoms, alkenylene of 5–8 carbon atoms, phenylene or naphthalene and Y is



and X each occurrence is oxygen or sulfur.

4,006,156

3-ALKYL-2-(NITROMETHYLENE) THIAZOLIDINE

James E. Powell, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed June 27, 1975, Ser. No. 590,984

Int. Cl.² C07D *277/10*

U.S. Cl. 260—306.7 R **2 Claims**

1. A 3-alkyl-2-(nitromethylene)thiazolidine in which the alkyl moiety has from 1 to 3 carbon atoms.

4,006,157

PROCESS FOR THE PREPARATION OF 1,2,4-TRIAZOLE DERIVATIVES

Beat Böhner, Binningen; Dag Dawes, Prattein; Hermann Kny, Fullinsdorf; Willy Meyer, Basel, all of Switzerland, and Jean Perchais, Rixheim, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 460,624, Dec. 4, 1974, abandoned. This application June 24, 1975, Ser. No. 589,991

Claims priority, application Switzerland, Apr. 17, 1973, 5495/73

Int. Cl.² C07D *249/12*

U.S. Cl. 260—308 R **3 Claims**

1. Process for the preparation of 1-isopropyl-3-hydroxy-5-chloro-1,2,4-triazole wherein isopropylhydrazine hydrochloride is reacted with N-chlorocarbonylisocyanide dichloride in approximately equimolar amounts in the presence of a polar solvent.

4,006,158

FLUORESCENT 1,2,3-TRIAZOLE DERIVATIVES OF 3-PHENYLCOUMARIN

Fritz Fleck, Bottmingen; Hans Balzer, Munchenstein, and Horst Aebli, Basel, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

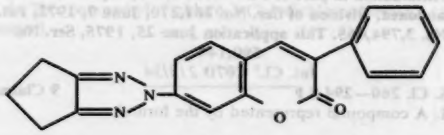
Continuation of Ser. No. 695,330, Jan. 3, 1968, abandoned. This application Apr. 28, 1975, Ser. No. 572,005

Claims priority, application Switzerland, Jan. 5, 1967, 108/67

Int. Cl.² C07D *405/04*, *405/10*

U.S. Cl. 260—308 B **1 Claim**

1. A compound having the formula



4,006,159

SUBSTITUTED 1,2,4-TRIAZOLE CARBOXAMIDES

Howard Newman, Monsey, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 14, 1975, Ser. No. 558,611

Int. Cl.² A61K *31/41*, *31/625*; C07D *249/10*

U.S. Cl. 260—308 R **6 Claims**

1. 1(and 2 and 4)-Octanoyl-s-triazole-3-carboxamide.

4,006,160

PROCESS FOR THE SYNTHESIS OF N-HYDROXYPYRROLES, N-HYDROXYIMIDAZOLES, AND DERIVATIVES THEREOF

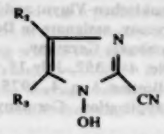
Rudolph Abraham Abramovitch, and Berkeley Wendell Cue, Jr., both of Tuscoloosa, Ala., assignors to University of Alabama, University, Ala.

Division of Ser. No. 341,663, March 15, 1973, Pat. No. 3,886,180. This application May 19, 1975, Ser. No. 578,895

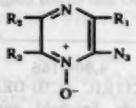
Int. Cl.² C07D *233/90*, *235/24*

U.S. Cl. 260—309 **1 Claim**

1. A process for the production of an N-hydroxyimidazole-2-carbonitrile compound possessing antibacterial activity and having the formula:



wherein R_3 is hydrogen, alkyl or aryl and R_2 is hydrogen, alkyl or aryl or R_3 and R_2 comprise part of a fused aromatic or heteroaromatic nucleus which comprises thermally decomposing a 2-azidopyrazine N-oxide having the formula:



in which R_1 is hydrogen, R_2 is hydrogen, alkyl or aryl and R_3 is hydrogen, alkyl or aryl or where R_2 and R_3 comprise part of a fused aromatic or heteroaromatic nucleus and said reaction being carried out in an inert solvent at a temperature above the decomposition temperature of the azide, under an anhydrous atmosphere.

4,006,161

THIO-SUBSTITUTED 2-OXO-INDOLINES

Richard E. Holmes, Indianapolis, and Glen P. Jourdan, Martinsville, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

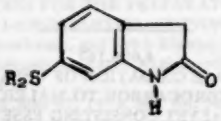
Filed Dec. 26, 1973, Ser. No. 427,946

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07D *209/34*

U.S. Cl. 260—325 R **5 Claims**

1. A compound of the formula



in which R_2 is C_1–C_3 alkyl, benzyl, halobenzyl, nitrobenzyl, C_1–C_3 alkylbenzyl, or phenyl.

4,006,162

IMINOISOINDOLINONE PIGMENTS

Ernst Model, Basel; Jost von der Crone, and André Pugin, both of Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

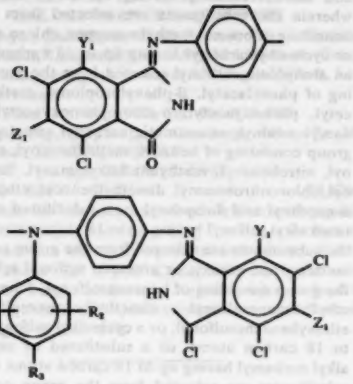
Filed May 6, 1975, Ser. No. 575,091

Claims priority, application Switzerland, May 7, 1974, 6181/74

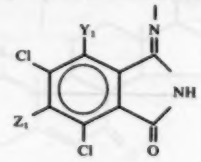
Int. Cl.² C07D *209/46*

U.S. Cl. 260—325 PH **5 Claims**

1. An iminoisoindolinone pigment of the formula



wherein Y_1 and Z_1 denote chloro, alkoxy containing 1 to 4 carbon atoms, R_1 and R_2 denote H, halogen, alkyl containing 1 to 4 carbon atoms, alkoxy containing 1 to 4 carbon atoms, phenoxy, phenoxy optionally substituted by chloro, alkyl containing 1 to 4 carbon atoms, or alkoxy containing 1 to 4 carbon atoms, or trifluoromethyl, R_3 denotes H, halogen, alkyl containing 1 to 4 carbon atoms, alkoxy containing 1 to 4 carbon atoms, or a group of the formula



4,006,163

ANTHRAQUINONE DYESTUFFS

Hans Peter Kölliker, Munchenstein, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

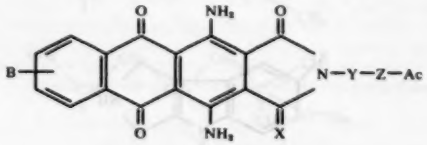
Filed Feb. 20, 1973, Ser. No. 333,823

Claims priority, application Switzerland, Mar. 21, 1972, 4169/72

Int. Cl.² C09B *5/24*; **C07D** *209/66, 209/68*

U.S. Cl. 260—326 C **14 Claims**

1. An anthraquinone dye of sparing aqueous solubility, of the formula



wherein

X represents oxygen or NH,

Y represents alkylene having up to 10 carbon atoms or alkylene of up to 10 carbon atoms interrupted by a thio group, an imino group, an N-methyl imino group, or one or two oxy groups, or is alkylene of up to 10 carbon atoms substituted by an —OH group or an —OAc group,

Z represents oxy or $—NR_1$, in which

R_1 represents alkyl of 1–4 carbon atoms or hydrogen, Ac

represents formyl or unsubstituted or substituted alkyl and alkenyl carbonyl having up to 18 carbon atoms wherein the substituents are selected from the group consisting of bromo, methylmercapto, chloro and ethoxy; or cycloalkylcarbonyl having up to 18 carbon atoms; or an araliphatic carbonyl selected from the group consisting of phenylacetyl, β-phenylpropionyl, methylphenylacetyl, phenoxyacetyl, p-chlorophenoxyacetyl and cinnamylcarbonyl; or aromatic carbonyl selected from the group consisting of benzoyl, methylbenzoyl, chlorobenzoyl, nitrobenzoyl, methylmethoxybenzoyl, benzoylbenzoyl, chloronitrobenzoyl, dimethylbenzoyl, ethoxybenzoyl, α-napthoyl and β-napthoyl; or a substituted or unsubstituted alkyl sulfonyl having up to 18 carbon atoms wherein the substituents are selected from the group consisting of methoxy and ethoxy; or aromatic sulfonyl selected from the group consisting of benzenesulfonyl, toluenesulfonyl, ethylbenzenesulfonyl, dimethylbenzenesulfonyl and ethoxybenzenesulfonyl; or a cycloalkyl sulfonyl having up to 18 carbon atoms; or a substituted or unsubstituted alkyl carbamyl having up to 18 carbon atoms wherein the substituents are selected from the group consisting of chloro, methoxycarbonyl and butoxycarbonyl; or a cycloalkyl carbamyl having up to 18 carbon atoms; or an aromatic carbamyl selected from the group consisting of p-phenylazophenylcarbamyl, phenylcarbamyl, tolylcarbamyl, chlorophenylcarbamyl, dimethylphenylcarbamyl, nitrophenylcarbamyl, dichlorophenylcarbamyl, methoxyphenylcarbanyl, napthlcarbamyl and biphenylylcarbamyl; or a heterocyclic carbamyl selected from the group consisting of tetrahydrofuryl-2-carbamyl, pyridyl-3-carbamyl, furyl-2-carbamyl and sulfonamyl-3-carbamyl; and

B represents chlorine, bromine or hydrogen.

4,006,164

4-ARYL-1,2,3,4-TETRAHYDROPYRROLO[3,4-b]INDOLES

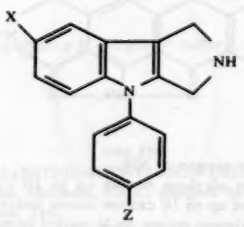
Willard M. Welch, Jr., North Stonington, and Charles A. Harbert, Waterford, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 456,641, April 1, 1974, Pat. No. 3,925,409. This application June 23, 1975, Ser. No. 589,384

Int. Cl.² C07D *487/04*

U.S. Cl. 260—326.5 B **3 Claims**

1. A compound selected from those of the formula



wherein X is selected from the group consisting of fluoro, chloro, bromo, methyl and hydrogen; and Z is selected from the group consisting of fluoro, chloro, methoxy and hydrogen.

4,006,165

PROCESS FOR CONVERTING MALEIC ANHYDRIDE TO γ-BUTYROLACTONE

Georg Michalczyk, Neukirchen-Vluyn, and Karl-Heinz Gluzek, Alpen, both of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Division of Ser. No. 488,352, July 15, 1974, Pat. No. 3,948,805. This application Aug. 4, 1975, Ser. No. 601,750

Claims priority, application Germany, Aug. 3, 1973, 2339343

Int. Cl.² C07D *307/32*

U.S. Cl. 260—343.6 **9 Claims**

1. A process for converting maleic anhydride to γ-butyrolactone which comprises treating said anhydride in the liquid phase with hydrogen at a temperature of from about 20° to 400° C. and a pressure of from about 50 to 350 kg/cm² in the presence of co-catalysts comprising palladium and nickel-copper chromite wherein the mole ratio of nickel as NiO to copper chromite as CuO and Cr_2O_3 ranges from about 1:0.1 to 1:5.0.

4,006,166

HYDROXYCITRIC ACID DERIVATIVES

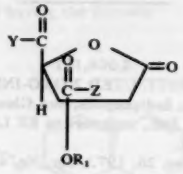
Robert William Guthrie, Fairfield, and Richard Wightman Kierstead, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 376,478, July 5, 1973, Pat. No. 3,919,254, which is a division of Ser. No. 204,288, Dec. 2, 1971, Pat. No. 3,767,678. This application Aug. 1, 1975, Ser. No. 601,678

Int. Cl.² C07D *307/32*

U.S. Cl. 260—343.6 **6 Claims**

1. A compound of the formula



wherein R_1 is lower alkanoyl; Y is NR_3R_4; Z is OR_2;

wherein R_2 is hydrogen; R_3 and R_4 each taken independently is hydrogen, lower alkyl, monocyclic cycloalkyl of 3 to 8 carbon atoms or 1-adamantyl;

or an optical antipode or a pharmaceutically acceptable salt thereof.

4,006,167

VAPOR PHASE OXIDATION OF UNSATURATED ALIPHATIC HYDROCARBON TO MALEIC ANHYDRIDE USING A CATALYST CONSISTING ESSENTIALLY OF THE OXIDES OF VANADIUM, PHOSPHOROUS, ZIRCONIUM, AND MANGANESE

Sumio Umemura; Kyoji Ohdan; Fumihiko Sakai; Yasuo Bando, and Harumi Ikezawa, all of Ube, Japan, assignors to UBE Industries, Ltd., Japan

Filed June 23, 1975, Ser. No. 589,518

Claims priority, application Japan, June 28, 1974, 49-73255; July 30, 1974, 49-86609

Int. Cl.² C07D *307/60*

U.S. Cl. 260—346.8 A **8 Claims**

1. A process for producing maleic anhydride by catalytic oxidation of an unsaturated aliphatic hydrocarbon having 4 to 6 carbon atoms, which comprises contacting a feed-gas mixture comprising said unsaturated aliphatic hydrocarbon and oxygen or an oxygen-containing gas in the vapor phase at a temperature of 300° C to 450° C for a period of 0.1 to 1.8 seconds with a catalyst consisting essentially of oxides of (A) vanadium, (B) phosphorus, (C) zirconium and (D) manganese in the atomic ratios defined by the formula

$VP_aZr_bMn_cO_d$

wherein each of *a*, *b* and *c* is a positive number indicating an atomic ratio of each of the aforesaid (B), (C) and (D) to vanadium and falling within the following ranges, $a = 1.0$ to 7.5, $b = 1.3$ to 96.0 and $c = 0.05$ to 1.0, and *d* is a positive number satisfying the average valency of the (A), (B), (C) and (D), and being within the range of 8 to 200.

4,006,168

CATALYST TREATMENT

Ralph O. Kerr, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Mar. 31, 1975, Ser. No. 563,740

Int. Cl.² C07D 307/60

U.S. Cl. 260—346.8 A **14 Claims**

1. In a process for the vapor phase oxidation of C_4 to C_8 hydrocabons to dicarboxylic acids wherein said hydrocarbon is contacted with a vanadium-molybdenum-oxygen catalyst, wherein said catalyst gradually decreases in activity, the improvement comprising adding to said catalyst, after said decrease in activity, a volatilized compound of molybdenum, nickel, cobalt, manganese, uranium or mixtures thereof.

4,006,169

EPOXIDATION OF α,β-ETHYLENIC KETONES

Elvin L. Anderson, Moorestown, N.J.; Bing L. Lam, Haverford, and George R. Wellman, Warminster, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Feb. 26, 1976, Ser. No. 661,478

Int. Cl.² C07D 303/32

U.S. Cl. 260—348 R **1 Claim**

1. 1,1,1Trichloro-3,4-epoxy-2-butanone and its hydrate said hydrate being 1,1,1-trichloro-2,2-dihydroxy-3,4-epoxybutane.

4,006,170

PROCESS FOR THE PREPARATION OF 1-AMINOANTHRAQUINONE

Horst Jäger, Leverkusen, and Erich Klauke, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 17, 1975, Ser. No. 587,748

Claims priority, application Germany, June 29, 1974, 2431409

Int. Cl.² C07B 29/00; C07C 97/24

U.S. Cl. 260—378 **24 Claims**

1. A process for preparing 1-aminoanthraquinone, comprising the steps of:

a. reacting o-chloromethylphenylisocyanate with at least an equivalent amount of benzene in anhydrous hydrofluoric acid at a temperature of about −10° to 200°C to form the lactam of 2-amino-diphenylmethane-2′-carboxylic acid.

b. saponifying the lactam of 2-amino-diphenylmethane-2′-carboxylic acid with aqueous alkali at a temperature above about 100°C to form the 2-amino- diphenylmethane-2′-carboxylic acid,

c. contacting the 2-amino-diphenylmethane-2′- carboxylic acid with an acid condensation agent, thereby to convert the carboxylic acid to 4-amino-anthrone, and

d. contacting the 4-aminoanthrone with an oxidizing agent in an acid or alkaline medium, thereby to convert the aminoanthrone to 1-aminoanthraquinone.

4,006,171

PROCESS FOR THE PREPARATION OF HALOGENOANTHRAQUINONES

Norbert Majer, Schildgen; Hans-Samuel Bien, Burscheid; Helmut Judat, Langenfeld, and Armin Lieberam, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 24, 1975, Ser. No. 625,725

Claims priority, application Germany, Nov. 2, 1974, 2452014; Nov. 23, 1974, 2455587

Int. Cl.² C07C 49/68

U.S. Cl. 260—384 **13 Claims**

1. A process for the preparation of a chloroanthraquinone or a bromoanthraquinone comprising forming a molten mixture of at least one nitroanthraquinone and diluent at a temperature of about 180° to 300° C, the diluent being in at least about 10% by weight of the mixture comprising at least one chloroanthraquinone or bromoanthraquinone, and thereafter adding halogen to said melt.

4,006,172

PROCESS FOR 7-KETO-Δ^5-STEROIDS

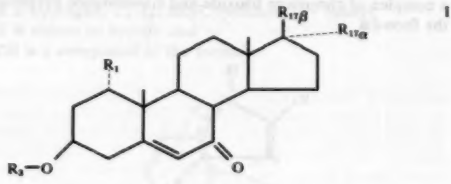
William G. Salmond, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Apr. 26, 1976, Ser. No. 680,022

Int. Cl.² C07J 9/00

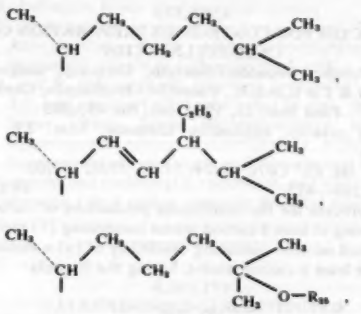
U.S. Cl. 260—397.2 **12 Claims**

1. An improved chemical process for the production of a steroid of the formula

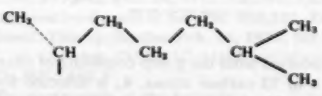


I

where R_1 is hydrogen, alkanoyloxy of 1 thru 6 carbon atoms or benzoyloxy; where R_3 is alkanoyl of 1 thru 6 carbon atoms or benzoyl; $R_{17}\alpha$ is hydrogen or methyl and $R_{17}\beta$ is



hydroxy or acetoxy where R_{23} is hydrogen, alkanoyl of 1 thru 6 carbon atoms or benzoyl with the provisos that (1) when $R_{17}\alpha$ is hydrogen, $R_{17}\beta$ is



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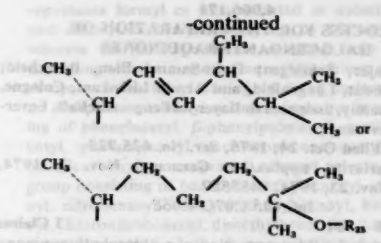
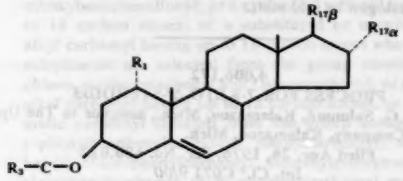
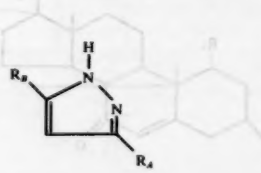


where R_{25} is defined above and (2) when R_{17} is methyl, R_{17} is hydroxy or acetoxy, where a compound of the formula



II

where R_1, R_3, R_{17} and R_{17} are defined above is oxidized at the C-7 position by an oxidizing agent followed by extraction and purification where the improvement comprises using a complex of chromium trioxide and a substituted pyrazole of the formula



III

as the oxidizing agent where R_4 and R_2 can be the same or different and are hydrogen, methyl or phenyl.

4,006,173

PROCESS FOR CONTINUOUS PREPARATION OF CARBOXYLIC ACIDS

Ulrich Zeidler, Dusseldorf-Benrath, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

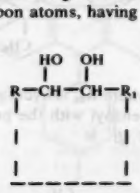
Filed Mar. 21, 1974, Ser. No. 453,505

Claims priority, application Germany, Mar. 23, 1973, 2314454

Int. Cl.² C07C *51/24, 51/33, 55/02, 57/00*

U.S. Cl. 260—413 **14 Claims**

1. A process for the continuous production of carboxylic acids having at least 5 carbon atoms comprising (1) providing an initiated mixture consisting essentially of (a) a vicinal diol having at least 6 carbon atoms, having the formula



wherein R is selected from the group consisting of phenyl and alkyl having 4 to 33 carbon atoms, R_1 is selected from the group consisting of hydrogen, phenyl and alkyl having 1 to 29 carbon atoms, and R and R_1 when taken together are butylene; with the proviso that the total number of carbon atoms in said vicinal diol does not exceed 35 carbon atoms, (b) the carboxylic acids formed therefrom and (c) a catalytic amount of a heavy metal compound catalyst of soluble compounds of heavy transition metals which have two different oxidation states and which can be oxidized into the higher of said two states during the reaction, into which (d) an oxygen containing stream of gas is continuously introduced; (2) continuously introducing into said initiated mixture a starting material mixture consisting essentially of said vicinal diol having at least 6 carbon atoms with 0.01 to 0.5 mol % of said heavy metal catalyst in such an amount and at such a rate that the reaction is maintained, the reaction being carried out at a predetermined temperature between 40° C and 200° C to produce an oxidation mixture; (3) continuously withdrawing said oxidation mixture at a rate substantially the same as the rate of introduction of said starting material mixture and (4) continuously recovering said carboxylic acids having at least 5 carbon atoms.

4,006,174

PROCESS FOR THE PREPARATION OF URANIUM (IV) CHELATED COMPOUNDS AND THORIUM CHELATED COMPOUNDS

Fausto Calderazzo, Ghezzano; Marco Pasquali, Pisa, and Pierpaolo Garibaldi, San Donato Milanese, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed Oct. 25, 1974, Ser. No. 518,193

Int. Cl.² C07F *5/00*

U.S. Cl. 260—429.1 **3 Claims**

1. The process of preparing a chelated compound of a metal selected from the group consisting of uranium (IV) and thorium which consists in reacting an anhydrous halide of uranium (IV) or thorium with a chelating agent in the presence of an anhydrous solvent and gaseous ammonia in the temperature range of from 20° to 60° C.

4,006,175

POROUS SILICIC ACID AND ITS PRODUCTION

Erich Termin, Laufenburg; Arnold Lenz, Cologne-Stammheim, and Otto Bleh, Bergheim, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Division of Ser. No. 98,244, Dec. 15, 1970, Pat. No. 3,850,971.

This application July 24, 1974, Ser. No. 491,420

Claims priority, application Germany, Dec. 18, 1969, 1963439

Int. Cl.² C07F *11/00*

U.S. Cl. 260—438.5 R **21 Claims**

1. Process for making porous silicic acid gel which comprises contacting methyl or ethyl silicate, or polymethyl or polyethyl silicate in the presence of a hydrolysis activating substance, with about 70 to 120% of the stoichiometric amount of water with stirring under conditions to achieve homogeneity to effect hydrolysis and produce solid silicic acid having a specific surface of about 50 to 1000 m^2/g, separating the solid silicic acid from the liquid and drying the resulting porous silicic acid, wherein during hydrolysis there is present about 0.1 to 30 mole % based on the silicate of an alcoholate of a transition metal or aluminum or magnesium stearate.

4,006,176

ORGANOSILANE COMPOUNDS

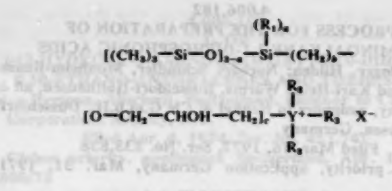
David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,538

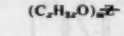
Int. Cl.² C07F *7/10, 7/18*

U.S. Cl. 260—448.2 N **11 Claims**

1. An organosilane having the formula



or siloxane oligomers thereof, wherein *a* is 0 to 2; R_1 is an alkyl group containing 1 to 18 carbon atoms; *b* is 1 to 3; *c* is 0 to 1; at least one R_2 is either (a) a carboxy-substituted alkyl group containing 1 to 4 carbon atoms, (b)



wherein *x* is 2 to 4, *m* is 1 to 20, Z is hydrogen, an alkyl group containing 1 to 18 carbon atoms, or an acyl group containing 1 to 4 carbon atoms, or (c) oxygen provided only one R_2 is oxygen and provided R_2 is not oxygen when *c* is 0 and that there is no Xwhen R_2 is oxygen, while the other R_2 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms; R_3 is an alkyl, aryl or arylalkyl group containing 1 to 22 carbon atoms; X is halide; and Y is nitrogen, phosphorus or sulfur.

4,006,177

METHANATION CATALYST RECOVERY

Thomas E. Kiovsky, and Milton M. Wald, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 3, 1975, Ser. No. 619,543
Int. Cl.² C07C *27/06*
U.S. Cl. 260—449 M **14 Claims**

1. A continuous process for the production of methane from a sulfur containing gaseous mixture containing hydrogen, carbon monoxide and/or carbon dioxide which comprises:

a. contacting said gaseous mixture in a reaction zone maintained at temperatures above about 500° C with a molten metal salt-based catalyst system comprising a molten metal salt carrier selected from the group consisting of the halides of zinc and cadmium, and mixtures thereof, melting below 1000° C, said molten salt having dispersed therein one or more catalytically active metals selected from the group consisting of iron, molybdenum, manganese, nickel, cobalt, zinc, titanium, silver, copper and thorium in the form of finely-divided elemental metals, metal oxides and/or metal carbides, wherein a gaseous product mixture is formed and a portion of the molten metal salt halide is converted to a metal sulfide to form a metal salt mixture.

b. separating the gaseous product mixture from the metal salt mixture,

c. separating a portion of the metal salt mixture and recycling the remainder of the metal salt mixture to the reaction zone,

d. reacting the portion of the metal salt mixture thus separated with a hydrogen halide at a temperature of between about 50° C and about 400° C in an amount stoichiometrically equivalent to the metal sulfide contained in the separated metal salt mixture thereby converting a stoichiometric portion of the metal sulfide to a metal halide, and

e. recycling the regenerated portion of the metal salt mixture containing the metal halide formed in step (d) to the reaction zone.

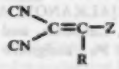
4,006,178

PROCESS FOR THE MANUFACTURE OF DICYANOVINYL COMPOUNDS

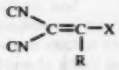
Mauro Stagi, Saronno, (Varese), Italy; Tibor Somlo, and Frantisek Gaspar, both of Birsfelden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 290,024, Sept. 18, 1972, abandoned. This application Mar. 27, 1975, Ser. No. 563,006
Claims priority, application Switzerland, Sept. 24, 1971, 13992/71; Aug. 15, 1972, 12093/72
Int. Cl.² C07D *215/06*; C07C *121/54*
U.S. Cl. 260—465 D **8 Claims**

1. A process for the manufacture of a compound of the formula



comprising the step of treating a compound, ZH, with a compound of the formula

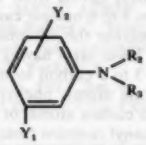


in an anhydrous organic solvent, in the absence of a Lewis acid, wherein

R is hydrogen, C_1 -C_4 alkyl, cyclohexyl or benzyl;

X is chloro or bromo; and

ZH is a compound of the formula



wherein

Y_1 hydrogen, lower alkyl or lower alkoxy;

Y_2 is hydrogen, lower alkyl, lower alkoxy, lower alkanoylamino, lower alkoxycarbonylamino, benzoylamino, chloro or trifluoromethyl; and

R_2 and R_3 independently represent lower alkyl, cycloalkyl, aryl, or lower alkyl substituted by aryl, cycloalkyl, lower alkoxy, lower alkylcarbonyloxy, lower alkylaminocarbonyloxy, arylcarbonyloxy, arylaminocarbonyloxy, cyano or chloro, and wherein aryl is phenyl or tolyl and cycloalkyl is cyclohexyl, and wherein lower denotes 1 to 4 carbon atoms in the alkyl moiety.

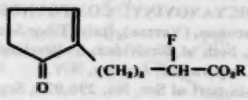
4,006,179

1-ALKOXIMINO-2-(ω-SUBSTITUTED ALKYL)-2-CYCLOPENTENES

Karel Francis Bernady, Suffern; John Frank Poletto, Nanuet, both of N.Y., and Martin Joseph Weiss, Oradell, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 480,908, June 19, 1974, which is a division of Ser. No. 335,842, Feb. 26, 1973, Pat. No. 3,836,581, which is a continuation-in-part of Ser. No. 208,951, Dec. 16, 1971, abandoned. This application Feb. 24, 1975, Ser. No. 552,686
Int. Cl.² C07C *61/38*, *69/74*
U.S. Cl. 260—468 J **3 Claims**

1. The compounds of the formula:



wherein R is selected from the group consisting of hydrogen and lower alkyl.

4,006,180

[1,3-DIHYDROXY-2-SUBSTITUTED AND 2,2-DISUBSTITUTED-INDANYLOXY(OR THIO)]ALKANOIC ACIDS

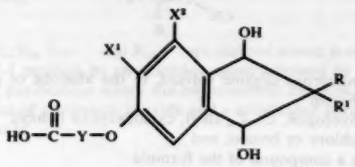
Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 405,964, Oct. 12, 1973, abandoned. This application July 31, 1974, Ser. No. 492,943

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 F **16 Claims**

1. A compound of the formula:



wherein R is lower alkyl having from 1 to 5 carbon atoms, cycloalkyl having from 5 to 6 nuclear carbon atoms, phenyl or substituted phenyl wherein the substituent is lower alkyl or halo; R^1 is hydrogen, lower alkyl having 1 to 5 carbon atoms, lower alkenyl having 3 to 5 carbon atoms, lower alkynyl having from 3 to 5 carbon atoms, phenyl lower alkyl wherein lower alkyl has 1 to 3 carbon atoms, or phenyl lower alkenyl wherein the lower alkenyl contains from 2 to 5 carbon atoms, phenyl or substituted phenyl wherein the substituents are lower alkyl or halo; or R and R^1 may be joined together with the carbon atoms to which they are attached to form a cycloalkyl having from 3 to 7 nuclear carbon atoms; X^1 is hydrogen, methyl or halo, and X^2 is methyl or halo; or X^1 and X^2 may be joined to form a hydrocarbylene chain containing 3 to 4 carbon atoms; and y is alkylene or haloalkylene containing a maximum of 4 carbon atoms, the diastereomeric form, the lower alkyl ester and the non-toxic, pharmacologically acceptable salt derivative thereof.

4,006,181

PROCESS FOR THE OBTAINING OF ESTERS OF ACETYLSALICYLIC ACID AND AMINO ALCOHOLS

Henri Cousse, and Gilbert Mouzin, both of Castres, France, assignors to Pierre Fabre S.A., Paris, France

Continuation of Ser. No. 382,400, July 25, 1973, abandoned. This application Apr. 23, 1975, Ser. No. 570,760

Int. Cl.² C07C *69/84*

U.S. Cl. 260—474 **5 Claims**

1. A process for preparing the hydrochloride of dimethylaminoethyl acetylsalicylate as a crystallization product comprising treating dimethylaminoethanol in chloroform solution at a temperature below 50° C. during the addition in the absence of pyridine with a stoichiometric amount of the chloride of acetylsalicylic acid and crystallizing the hydrochloride of dimethylaminoethyl acetylsalicylate directly from the reaction mixture.

4,006,182

PROCESS FOR THE PREPARATION OF 1-AMINOALKANE-1,1-DIPHOSPHONIC ACIDS

Walter Ploger, Hilden; Norbert Schindler, Monheim-Baumberg, and Karl-Heinz Worms, Dusseldorf-Holthausen, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

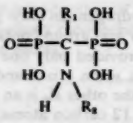
Filed Mar. 16, 1972, Ser. No. 235,838

Claims priority, application Germany, Mar. 31, 1971, 2115737

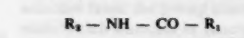
Int. Cl.² C07F *9/38*

U.S. Cl. 260—502.5 **4 Claims**

1. Process for the preparation of 1-aminoalkane-1,1-diphosphonic acids of the formula



in which R_1 represents a member selected from the group consisting of alkyl with 1 to 20 carbon atoms, phenyl, phenylalkyl with 7 to 12 carbon atoms, alkylphenyl with 7 to 12 carbon atoms, and in which R_2 represents a member selected from the group consisting of hydrogen and alkyl with 1 to 4 carbon atoms, consisting essentially of reacting at a temperature of 100° to 170° C adducts of a hydrogen halide selected from the group consisting of HCl and HBr to a corresponding carboxylic acid amide of the formula



wherein R_1 and R_2 have the above-assigned meanings, with phosphorous acid, in the molar ratio of carboxylic acid amide: phosphorous acid of 1:0.5 to 1:3; and recovering said 1-aminoalkane-1,1-diphosphonic acids.

4,006,183

SUBSTITUTED α-METHYLSULFINYL-O-TOLUIDINES

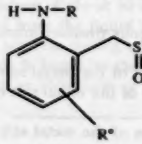
Thomas E. Jackson, Madison, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed July 8, 1975, Ser. No. 594,120

Int. Cl.² C07C *103/78, 87/56;* A61K *31/165, 31/135*

U.S. Cl. 260—558 S **4 Claims**

1. A compound of the formula:



wherein

R° is hydrogen or CF_3, wherein said CF_3 is in the 3- or 4-position of the ring, and

R is hydrogen or meta- or paratrifluoromethyl-benzoyl,

provided that when one of R° and R is hydrogen, the other is other than hydrogen;

or a pharmaceutically acceptable acid addition salt thereof.

4,006,184

1- OR 2-[2-HYDROXY-3-AMINO-PROPOXY]-9,10-DIHYDRO-9,10-ETHANO-ANTHRACENES AND THEIR SALTS

Atso Ilvespaa, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

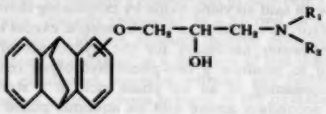
Filed Apr. 4, 1974, Ser. No. 457,741

Claims priority, application Switzerland, Apr. 17, 1973, 5500/73

Int. Cl.² C07C *93/06*

U.S. Cl. 260—570.7 **7 Claims**

1. A compound of the formula III



(III)

wherein R_1 represents hydrogen or lower alkyl, R_2 represents hydrogen or lower alkyl and the 3-amino-2-hydroxypropoxy side chain is in the 1- or 2-position of the anthracene skeleton, and the pharmaceutically acceptable salts thereof.

4,006,185

5-SUBSTITUTED-2-FLUOROANILINES

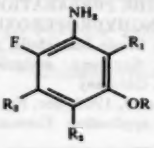
John H. Tobin, Beacon Falls, and John A. Wojtowicz, Cheshire, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 381,838, July 23, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 535,073

Int. Cl.² C07C *85/00*, *87/00*

U.S. Cl. 260—575 **3 Claims**

1. 5-Substituted-2-fluoroanilines having the formula



wherein R is selected from the group consisting of hydrogen and lower alkyl having 1–4 carbon atoms and R_1, R_2 and R_3 are each independently selected from the group consisting of hydrogen, halogen and lower alkyl having 1–4 carbons.

4,006,186

PROCESS FOR THE PREPARATION OF THIOPHENOLS

Hans Dieter Engels, Solingen, and Rolf-Jürgen Singer, Wuppertal-Vohwinkel, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

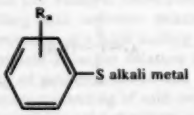
Continuation of Ser. No. 240,845, April 3, 1972, abandoned. This application May 2, 1974, Ser. No. 466,312

Claims priority, application Germany, Apr. 7, 1971, 2116978

Int. Cl.² C07C *149/00*, *149/12*

U.S. Cl. 260—577 **21 Claims**

1. A process for the production of a thiophenolate of the formula



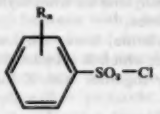
in which

n is an integer from 0 to 5, inclusive, and

R is hydroxy, nitro, halogen, alkyl of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms, amino, monoalkylamino or dialkylamino, wherein each alkyl is of from 1 to 6 carbon atoms, the radicals R being identical or different when n is from 2 to 5;

which consists essentially of the steps of:

i. contacting a phenylsulfonic acid chloride of the formula



in which R and n are defined as above with hydrazine in a reaction vessel and maintaining the resultant mixture at a temperature of 0° to 40° C;

ii. adding to said mixture in said reaction vessel hydriodic acid and hydrochloric acid and thereafter maintaining the reaction mixture at a temperature of 60°–120° C;

iii. thereafter neutralizing any acid in said reaction mixture by addition of an alkali; and

iv. adding to the so neutralized reaction mixture additional hydrazine and an alkali so that the mol ratio of disulfide in the reaction mixture to alkali to hydrazine is 1:2–3:2–5 and maintaining the reaction mixture for several hours at 60° to 120° C until thiophenolate is formed.

4,006,187

PREPARATION OF ARYLLITHIUM COMPOUNDS BY METALATION

Conrad W. Kamienski; Robert C. Morrison, and Kenneth R. Martin, all of Gastonia, N.C., assignors to Lithium Corporation of America, New York, N.Y.

Filed Oct. 6, 1971, Ser. No. 187,149

Int. Cl.² C07C *87/52*; C07F *1/02*

U.S. Cl. 260—577 **11 Claims**

1. A process for the preparation of aryllithium compounds which consists in metalating (a) an aromatic compound selected from the group consisting of substituted benzenes in which metalation of the substituent is effected and in which the substituents are selected from the group consisting of alkyl, alkoxy and dialkylamino with (b) an adduct of an organolithium compound, selected from the group consisting of C_3–C_{12} alkyllithiums and cycloalkyllithiums, with a vinyl-substituted aromatic compound, in the presence of (c) a member selected from the group consisting of tertiary alkyl amines containing no methyl group and aryl tertiary amines in which the nitrogen of said aryl tertiary amine is directly attached to an aromatic radical, the ratio of the lithium in the (b) adduct to the (c) ingredient being in the range of 1 gram atom of lithium to from about 0.25 to about 4.5 gram moles of the (c) ingredient.

4,006,188

CYCLOALKENONES

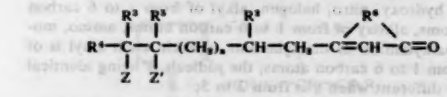
Clive A. Henrick, and Jeffery N. Labovitz, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 590,231, June 25, 1975, which is a continuation-in-part of Ser. No. 464,880, April 29, 1974, abandoned. This application Apr. 30, 1976, Ser. No. 681,968

Int. Cl.² C07C *49/46*, *49/45*, *49/48*

U.S. Cl. 260—586 R **8 Claims**

1. A compound of the formula:



wherein,

each of R^2 and R^4 is lower alkyl;

each of R^3 and R^5 is hydrogen or lower alkyl;

R^6 is methylene, ethylene or trimethylene;

n is one, two or three;

Z is hydrogen, chlorine, lower alkyl or one of the groups —OR or —SR in which R is hydrogen or lower alkyl; and

Z′ is hydrogen or together with Z forms a carboncarbon bond.

4,006,189

PROCESS FOR PURIFYING GLYOXAL

August Sommer, Herne, and Richard Wessendorf, Essen-Heisingen, both of Germany, assignors to Veba Chemie AG, Gelsenkirchen-Buer, Germany

Filed June 11, 1974, Ser. No. 478,431

Claims priority, application Germany, June 13, 1973, 2329957

Int. Cl.² C07C *47/02*

U.S. Cl. 260—601 R **6 Claims**

1. In a process for the recovery of an aqueous solution of purified glyoxal hydrate from a mixture of glyoxal, volatile acids and non-volatile acids wherein said mixture is subjected to distillation to remove said volatile acids to leave behind a residue of said glyoxal and said non-volatile acids and to said residue there is added an alkali to neutralize said non-volatile ile acids and convert them to the corresponding alkali salt, the improvement for recovering a purified aqueous solution of glyoxal hydrate which comprises the steps of:

A. Contacting the resultant mixture following addition of said alkali with a C_1–C_3 alcohol while maintaining the pH of the resultant solution in the acid range and removing liberated water by distillation;

B. Removing alkali salts of said non-volatile acids leaving behind glyoxal-di-(alkyl hemiacetal);

C. Contacting said glyoxal-di-(alkyl hemiacetal) with water under neutral hydrolysis conditions; and

D. recovering an aqueous solution of glyoxal hydrate.

4,006,190

PRODUCTION OF HYDROXYL COMPOUNDS

Gerald S. Koermer, Corpus Christi, Tex., assignor to Celanese Corporation, New York, N.Y.

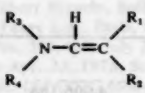
Filed Mar. 15, 1976, Ser. No. 666,842

Int. Cl.² C07C *47/19, 29/14, 31/20*

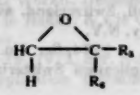
U.S. Cl. 260—602 **14 Claims**

1. A process comprising the successive steps of:

a. reacting in a liquid phase a sterically hindered enamine with an alkylene oxide, said sterically hindered enamine being of the formula:

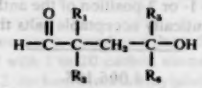


wherein R_1 and R_2 are alike or different and are hydrogen or lower alkyl groups, and wherein R_3 and R_4 are each an organic group containing at least three carbon atoms or which compositely form a single divalent organic group containing at least six carbon atoms, R_3 and R_4 being of a nature to sterically hinder the nitrogen atom of said enamine but which contain no groups which under process conditions are reactive to any substantial extent with themseleves, with said enamine or with the other reactants used and products formed in this said process, said alkylene oxide being of a formula:



wherein R_5 and R_6 are alike or different and are hydrogen or lower alkyl groups,

b. hydrolyzing the compound formed by the reaction of said enamine with said alkylene oxide by combining therewith under hydrolysis condition a stoichiometric excess of the amount of water necessary for the hydrolysis of said compound to produce a two-phase hydrolysis reaction product consisting of an oil phase rich in a sterically hindered secondary amine and an aqueous phase comprising an aqueous solution of a monohydroxyl alkyl aldehyde of the formula:



wherein R_1, R_2, R_5 and R_6 are set forth above, and

c. treating said two-phase hydrolysis reaction product to separate and recover therefrom said aqueous phase comprising an aqueous solution of a said monohydroxyl alkyl aldehyde.

4,006,191

PROCESS FOR THE PREPARATION OF ARALKYL MONOHYDROPEROXIDES

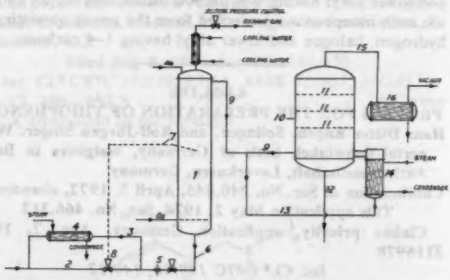
Heinrich Sodomann; Bruno Hauschulz, and Günther Althoff, all of Gladbeck, Germany, assignors to Phenolchemie GmbH, Gladbeck, Germany

Filed Jan. 9, 1969, Ser. No. 791,539

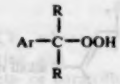
Claims priority, application Germany, Jan. 13, 1968, 1668575

Int. Cl.² C07C *179/02*

U.S. Cl. 260—610 B **4 Claims**



1. Process for the preparation of aralkyl monohydroperoxides of the formula:



wherein Ar represents phenyl and R represents methyl, which comprises oxidizing a hydrocarbon of the formula:

wherein Ar and R are as above defined with a member selected from the group consisting of oxygen and oxygen-containing gases at a temperature of about 40° to 135° C in the absence water, acid binding agents and reaction-promoting additives, to provide a conversion of between 5 to 30% hydroperoxide, directly thereafter in a second step directly introducing the oxidation product thereby obtained into a treatment zone maintained at a pressure of less than 150 Torr and under conditions whereby without any further heat input, unreacted hydrocarbons present in the oxidation product are evaporated and separated from said hydroperoxide, the heat required for the evaporation being derived solely from the heat liberated in the formation of the aralkyl monohydroperoxides.

4,006,192

1,1-DI-(2,7 OCTADIENEOXYMETHYLENE)-1-(HYDROXYMETHYLENE)ALKANE

Satoru Enomoto, Fujisawa; Hitoshi Takita, Tokyo; Mikiro Yanaka, Matsudo; Yutaka Mukaida, and Hisayuki Wada, both of Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1974, Ser. No. 535,697

Claims priority, application Japan, Dec. 27, 1973, 49-144302

Int. Cl.² C07C *43/02*

U.S. Cl. 260—615 R **2 Claims**

1. 1,1-di-(2,7 octadieneoxymethylene)-1-(hydroxymethylene)propane.

4,006,193

ISOMERIZATION OF THE UNSATURATED ALCOHOLS

Yoichi Ninagawa; Takashi Nishida, and Kazuo Itoi, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Mar. 12, 1973, Ser. No. 340,585

Claims priority, application Japan, June 14, 1972, 47-59183; Mar. 13, 1972, 47-26017; June 14, 1972, 47-59182

Int. Cl.² C07C *33/02*

U.S. Cl. 260—617 R **7 Claims**

1. In a process for preparing a mixture of geraniol and nerol which comprises the steps of isomerizing linalool in the presence of an orthovanadic acid ester catalyst wherein the ester moiety thereof is derived from a $C_1 - C_{10}$ alkyl, cycloalkyl or alkenyl alcohol at about 100° to 300° C and distilling the reaction mixture consisting of geraniol, nerol, unreacted linalool and the catalyst under reduced pressure to remove unreacted linalool and the catalyst therefrom the improvement comprising distilling said reaction mixture under reduced pressure in the presence of a high boiling solvent to separate said catalyst from said reaction mixture to form a distillate mixture consisting of geraniol, nerol and unreacted linalool, and a bottom mixture consisting of said catalyst with said high boiling solvent, rectifying said distillate mixture of geraniol, nerol and unreacted linalool, to remove said unreacted linalool therefrom to obtain a mixture of geraniol and nerol.

4,006,194

PRODUCTION OF PHENOLS

Benjamin J. Luberoff, Summit, and Todd S. Simmons, Montclair, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed May 17, 1971, Ser. No. 143,845

Int. Cl.² C07C *37/00*

U.S. Cl. 260—621 C **7 Claims**

1. A process for producing a phenol comprising: catalytically reacting by heating in the liquid phase an alkyl benzene selected from the group consisting of toluene, cumene isobutyl benzene and ethyl benzene with t-butyl hydroperoxide in the presence of a catalyst selected from the group consisting of the chlorides, naphthenates and acetylacetonates of cobalt, copper, manganese, iron and nickel to produce the corresponding t-butyl-α-phenalkyl peroxide; heating a reaction mixture comprising the t-butyl-α-phenalkyl peroxide and an acid catalyst to decompose the peroxide; said heating being effected to provide a temperature at which the carbonyl and alkanol decomposition products of said peroxide can be separated from the reaction mixture in gaseous form and the phenol decomposition product of said peroxide is a liquid; continuously separating from the reaction mixture, in gaseous form, the carbonyl and alkanol decomposition products; and recovering the phenol from the reaction mixture.

4,006,195

PROCESS FOR THE CATALYTIC PRODUCTION OF DICHLOROTOLUENES

Samuel Gelfand, Niagara Falls, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 420,992, Dec. 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 204,740, Dec. 3, 1971, abandoned. This application Sept. 10, 1975, Ser. No. 612,071

Int. Cl.² C07C *25/04*

U.S. Cl. 260—650 R **4 Claims**

1. An improved process for the production of 2,4-dichlorotoluene comprising the steps of

1. reacting para-chlorotoluene, in the liquid phase, with gaseous chlorine in a mole ratio of about 0.5:1 to about 1.5:1 at a temperature from about 0° to about 100° C in the presence of from about 0.05% to about 3.0% by weight of a catalyst consisting of antimony trichloride to yield a product containing 2,4-dichlorotoluene;
2. treating the product of step (1) with anhydrous ammonia and removing the catalyst by filtration; and
3. distilling the product of Step (2) to yield substantially pure 2,4-dichlorotoluene.

4,006,196

PROCESS FOR THE MANUFACTURE OF GERANYL CHLORIDE

Jimmy H. Chan, Martinez, and Harold M. Pitt, Lafayette, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 4, 1976, Ser. No. 663,948

Int. Cl.² C07C *21/00*

U.S. Cl. 260—654 R **8 Claims**

1. A process for the manufacture of geranyl chloride comprising reacting geraniol and chlorodimethylformiminium chloride.

4,006,197

PROCESS FOR SEPARATING NORMAL PARAFFINS

Herbert J. Bieser, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 19, 1975, Ser. No. 633,183

Int. Cl.² C10G *25/04*; C07C *7/13*

U.S. Cl. 260—676 MS **18 Claims**

1. In a process for the separation of normal paraffins from a feed stream comprising a mixture of normal paraffins and

isoparaffins which process employs an adsorbent comprising a shapeselective zeolite and comprises the steps of:

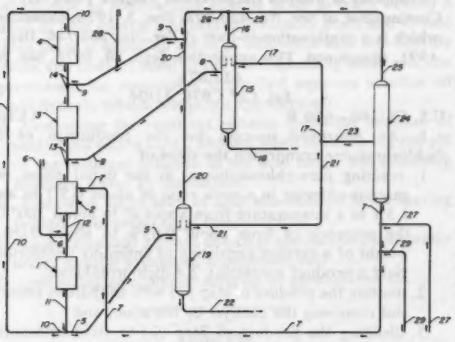
a. maintaining net fluid flow through a column of an adsorbent in a single direction, which column contains at least three zones having separate operational functions occuring therein and being serially interconnected with the terminal zones of said column connected to provide a continuous connection of said zones;

b. maintaining an adsorption zone in said column, said zone defined by the adsorbent located between a feed input stream at an upstream boundary of said zone and a raffinate output stream at a downstream boundary of said zone;

c. maintaining a purification zone immediately upstream from said adsorption zone, said purification zone defined by the absorbent location between an extract output stream at an upsteam boundary of said purification zone and said feed input stream at a downstream boundary of said purification zone, said purification zone having a sweeping agent input stream located upstream from said feed input stream;

d. maintaining a desorption zone immediately upstream from said purification zone, said desorption zone defined by the adsorbent located between a desorbent input stream at an upstream boundary of said zone and said extract output stream at a downstream boundary of said zone;

e. passing a sweeping agent comprising a raffinate-type compound into said purification zone;



f. passing said feed stream into said adsorption zone at adsorption conditions to effect the selective adsorption of said normal paraffins by said adsorbent and withdrawing a raffinate output stream comprising isoparaffins, sweeping agent and a hereinafter described desorbent material from said adsorption zone;

g. passing a desorbent material into said desorption zone at desorption conditions to effect the displacement of normal paraffins from the adsorbent in said desorption zone and withdrawing an extract output stream comprising normal paraffins, sweeping agent and desorbent material from said desorption zone;

h. passing at least a portion of said extract output stream to a first fractionation means and therein fractionating at first fractionating conditions said extract output stream to produce a first overhead stream comprising a mixture of sweeping agent and desorbent material and a first bottoms fraction comprising normal paraffins;

i. passing at least a portion of said raffinate output stream to a second fractionation means and therein fractionating at second fractionating conditions said raffinate output stream to produce a second overhead stream comprising a mixture of sweeping agent and desorbent material and a second bottom fraction comprising isoparaffins;

j. separating in a third fractionation means maintained at third fractionating conditions mixture of sweeping agent and desorbent material to produce a third overhead stream comprising desorbent material and a third bottoms fraction comprising sweeping agent;

k. recycling at least a portion of said third overhead stream to said desorption zone;

l. recycling at least a portion of said third bottoms fraction to said purification zone;

m. periodically advancing through said column of adsorbent particles in a downstream direction with respect to fluid flow in said adsorption zone the feed input stream, raffinate output stream, desorbent input stream and extract output stream to effect the shifting of zones through said mass of adsorbent and the production of extract output and raffinate output streams, wherein the improvement comprises a fractionating and recycle method which comprises the steps of:

i. removing a sidecut stream comprising sweeping agent and desorbent material from said first or second fractionation means, said sidecut stream containing a lower concentration of desorbent material than either said first overhead stream or said second overhead stream;

ii. passing at least a portion of said sidecut stream to said third fractionation means maintained at fractionating conditions and therein separating said sidecut stream to produce said third overhead stream and said third bottoms fraction, and

iii. passing in admixture at least a portion each of said third overhead stream, said first overhead stream and said second overhead to said desorption zone.

4,006,198

METHOD FOR THE PREPARATION OF TERTIARY OLEFINS

Renato Tesei; Vittorio Fattore, and Franco Buonomo, all of San Donato Milanese, Italy, assignors to Snam Progetti, S.p.A., San Donato Milanese, Italy

Filed Aug. 1, 1975, Ser. No. 601,207

Claims priority, application Italy, Aug. 2, 1974, 25938/74

Int. Cl.² C07C *1/00, 1/24*

U.S. Cl. 260—682 **12 Claims**

1. A method for the preparation of tertiary olefins starting from the corresponding tertiary ethers, consisting in contacting the ether with a catalyst compound by active alumina obtained by reacting alumina with a silicon compound selected among those corresponding to the following formula:

wherein X,Y,Z and W can be —R,—OR, —Cl, —Br, $-SH_2$, —COOR, $-SiH_nCl_m$ R being hydrogen, an alkyl, cocloalkyl, aryl, aralkyl, or alkyl-cycloalkyl radicals having from 1 to 30 carbon atoms, *n* and *m* being integers comprised between 1 and 3 and thereafter drying and subjecting the reacted alumina to controlled oxidation.

4,006,199

METHOD FOR PREPARATION OF LIQUID POLYOLEFIN OIL

Hiroshi Isa, Yachiyo; Hiroshi Mandai, Chiba; Toshiyuki Ukigai, Yachiyo; Anri Tominaga, Tokyo, and Tatsuji Yamashita, Chiba, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Apr. 15, 1976, Ser. No. 677,158

Claims priority, application Japan, Apr. 22, 1975, 50-49004

Int. Cl.² C07C *3/18*

U.S. Cl. 260—683.15 B **6 Claims**

1. A method of preparing a liquid polyolefin oil, which comprises polymerizing at a temperature of from -20° to 100° C, an olefin or a mixture of olefins having 6 or more carbon

atoms, in the presence of a catalyst mixture of (a) a dicarbonyl compound selected from the group consisting of acyclic or cyclic diketones and ketoesters and (b) an aluminum halide in an amount of from 0.7 to 5 mole per one carbonyl group or ester bond of said dicarbonyl compound, and recovering a liquid polyolefin oil from the polymerization reaction mixture.

4,006,200

POWDER PAINT BLEND COMPRISING EPOXY-FUNCTIONAL COPOLYMER AND CARBOXY AND AMIDE-FUNCTIONAL COPOLYMER

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 426,164, Dec. 19, 1973, Pat. No. 3,959,405. This application Jan. 7, 1976, Ser. No. 644,498

Int. Cl.² C08L *63/10*

U.S. Cl. 260—836 **1 Claim**

1. In a thermosettable powder paint which exclusive of pigments, catalysts, antistatic agents and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

A. a carboxy functional polymer,

B. an epoxy-functional copolymer of monoethylenically unsaturated monomers,

C. 0.05 to about 4 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture,

the improvement wherein,

1. said carboxy-functional polymer has glass transition temperature in the range of about 40° to about 90° C. and molecular weight in the range of about 1500 to about 15,000, and is a qualitatively difunctional copolymer of monoethylenically unsaturated monomers consisting essentially of about 5 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid selected from acrylic and methacrylic acid, about 2 to about 10 weight percent of an alpha-beta olefinically unsaturated amide selected from acrylamide and methacrylamide, and about 70 to about 93 weight percent of monoethylenically unsaturated, quantitatively and qualitatively monofunctional monomers, consisting essentially of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid and $C_8 - C_{12}$ monovinyl hydrocarbons, and

2. said epoxy-functional copolymer of monoethylenically unsaturated monomers is qualitatively monofunctional, has glass transition temperature in the range of about 40° C. and molecular weight in the range of about 1500 to about 15,000, and consists essentially of about 5 to about 20 weight percent of a glycidyl ester of monoethylenically unsaturated carboxylic acid and about 80 to about 85 weight percent of monofunctional monomers selected from the group consisting of esters of a $C_1 - C_8$ monohydric alcohol and acrylic acid, esters of a $C_1 - C_8$ monohydric alcohol and methacrylic acid and $C_8 - C_{12}$ monovinyl hydrocarbons.

4,006,201

PROCESS FOR THE PRODUCTION OF POLYVINYL CHLORIDE GRAFT COPOLYMERS

Johann Bauer; Klaus Adler; Gerhard Beier; Heinz Hefner, and Alex Sabel, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Sept. 3, 1974, Ser. No. 502,869

Claims priority, application Germany, Sept. 4, 1973, 2344553

Int. Cl.² C08F *263/00*; C08L *31/04*

U.S. Cl. 260—878 R **6 Claims**

1. In the process for the production of polyvinyl chloride grafted copolymers from ethylene/vinyl acetate copolymers and vinyl chloride which comprises graft polymerizing vinyl chloride onto an ethylene/vinyl acetate copolymer in an aqueous phase in the presence of a polymerization catalyst at a temperature and time sufficient to effect polymerization and recovering said polyvinyl chloride grafted copolymer, the improvement consisting of utilizing an ethylene/vinyl acetate copolymer dispersion in water in the presence of a water-soluble, free-radical-forming catalyst as said polymerization catalyst and adding vinyl chloride to the stirred reactants during polymerization at such a rate that the pressure is maintained below the saturation pressure of vinyl chloride at the polymerization temperature.

4,006,202

POLYMER COMPOSITION

James M. Watson, Big Spring, Tex., assignor to Cosden Oil & Chemical Company, Big Spring, Tex.

Filed Oct. 2, 1972, Ser. No. 294,015

Int. Cl.² C08L *9/06*

U.S. Cl. 260—880 R **12 Claims**

1. A copolymer comprised of 64 to 98% by weight of styrene and 1 to 24% by weight of SO_2 homogeneously copolymerized with 1 to 12% by weight of an elastomer, said copolymer being prepared by copolymerizing said styrene and said SO_2 in the presence of an elastomer dissolved in said styrene at a temperature of between 0 and 90° C.

4,006,203

PHOSPHINYL GUANIDINE DERIVATIVES

Leon H. Chance, New Orleans, and Cletus E. Morris, Metairie, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 15, 1976, Ser. No. 667,054

Int. Cl.² C07F *9/24*

U.S. Cl. 260—940 **3 Claims**

1. 2-Cyano-1-[bis(dimethylamino)phosphinyl]guanidine.

4,006,204

PHOSPHORIC ACID DIESTERS

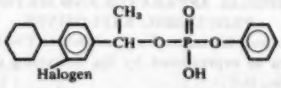
Vithal J. Rajadhyaksha, Mission Viejo; James V. Peck, Newport Beach, and William D. Fairbairn, Atherton, all of Calif., assignors to Nelson Research & Development Company, Irvine, Calif.

Filed Apr. 30, 1975, Ser. No. 572,888

Int. Cl.² C07F *9/12, 9/09, 9/40*

U.S. Cl. 260—958 **8 Claims**

1. A compound having the structural formula



and a pharmaceutically acceptable salt thereof.

4,006,205

MEANS FOR APPLYING ADDITIVES TO INDUSTRIAL GAS

Berwyn E. Etter, 10355 Paradise Blvd., Treasure Island, Fla. 33740

Continuation-in-part of Ser. No. 558,945, March 17, 1975, Pat. No. 3,924,648, which is a continuation of Ser. No. 358,005, May 7, 1973, abandoned. This application Oct. 14, 1975, Ser. No. 622,403

Int. Cl.² B01F *3/04*

U.S. Cl. 261—39 R **7 Claims**

1. An apparatus for applying additives to industrial gas, comprising,

a container having a top, a bottom and sides forming and enclosed chamber,

an inlet port in said chamber adapted to be connected to a source of pressurized industrial gas,

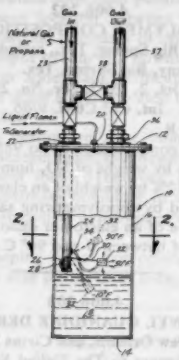
a quantity of liquid gas additive in the bottom of said chamber,

a movable arm means mounted within said chamber,

a gas discharge means on said arm means,

said arm means being automatically temperature responsively movable from a first position wherein said gas discharge means is immersed in the liquid gas additive to a second position wherein said gas discharge means is positioned above said liquid gas additive,

a thermal responsive element means connected to said arm



means to cause said arm means to move between its said first and second positions so that said gas discharge means will be immersed in said liquid gas additive when the temperature within said chamber is at least 0° F, and to progressively rise out of and above said liquid gas additive when the temperature within said chamber is increased,

conduit means connecting said inlet port and said gas discharge means so that said industrial gas is discharged within said liquid gas additive when said gas discharge means is submerged therein; and discharge above said liquid gas additive when said gas discharge means is positioned thereabove, and

an outlet port in said chamber adapted to discharge the gas resulting from the mixture of said industrial gas and said liquid gas additive.

4,006,206

CENTRIFUGAL APPARATUS AND METHOD FOR PROCESSING EXPLOSIVES

Robert W. Evans, Herndon, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 507,821, Sept. 20, 1974. This application Mar. 26, 1976, Ser. No. 670,818

Int. Cl.² G21C *21/00*

U.S. Cl. 264—3 E **3 Claims**

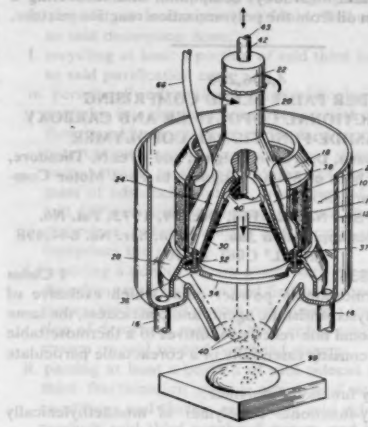
1. A method for processing a liquid slurry of primary explosive to produce a dry, free-flowing explosive product free from agglomerates, which comprises:

a. introducing the liquid slurry of primary explosive into a centrifugal extractor basket wherein the explosive solids are retained and the liquid medium is removed, said extractor basket having an open bottom which is closed by being peripherally attached to the large open end of a flexible invertible funnel whose small open end is held upright to retain the contents of said basket;

b. introducing wash liquid to displace adhering liquid slurry medium from the explosive solids;

c. introducing gaseous drying medium to remove adhering liquid from said explosive solids to produce a dry, free-flowing product free from agglomerates; and

d. inverting the flexible funnel to discharge said product through the small open end of said funnel,



said basket being rotated during the processing to effect removal of liquid.

4,006,207

MAKING SILICONE RUBBER MOLDS FROM RECLAIMED CURED SILICONE RUBBER PARTICLES AND LIQUID UNCURED SILICONE RUBBER

Leon Yeshin, Kitchener, Canada, assignor to Electrohome Limited, Kitchener, Canada

Filed Mar. 26, 1975, Ser. No. 562,210

Int. Cl.³ B29C *1/02*

U.S. Cl. 264—108 **16 Claims**

1. A process for making a silicone rubber mould which comprises providing in a mould having an exposed surface of a master to be reproduced an amalgamation of an uncured, liquid, castable silicone rubber and compatible, reclaimed, cured silicone rubber particles having a specific gravity less than the specific gravity of the liquid, silicone rubber, said surface being below said amalgamation, permitting the compatible, reclaimed silicone rubber particles to float away from said surface of said master leaving said liquid, silicone rubber in contact with said surface, curing said liquid, silicone rubber and removing the resultant silicone rubber mould from said master.

4,006,208

PROCESS FOR MANUFACTURING ELASTIC HARD FIBERS

Hirotaka Toba; Keiichi Ohata, and Nagayoshi Tsukane, all of Saitama, Japan, assignors to Daicel, Ltd., Osaka, Japan

Continuation of Ser. No. 370,968, June 18, 1973, abandoned. This application Oct. 16, 1975, Ser. No. 622,953

Claims priority, application Japan, June 22, 1972, 47-62722

Int. Cl.² D01D *5/08*

U.S. Cl. 264—176 F **9 Claims**

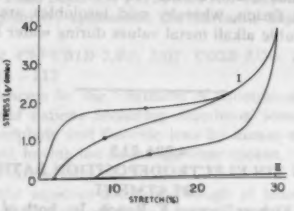
1. A process of forming an elastic polyisobutylene oxide filament, which comprises:

melt extruding a molten filament-forming isobutylene oxide polymer composition at a temperature in the range of from 175° C up to the decomposition temperature of polyisobutylene oxide into a filament, at least 60% of the repeating structural units of the polymer being isobutylene oxide monomer units;

stretching the molten filament issuing from the spinneret orifice at a draw ratio of from 50 to 1000, wherein draw

ratio is defined as the wind-up speed of the filament divided by the flow speed of the molten polymer composition issuing from the spinneret orifice;

quenching the filament to a temperature of from −20° C to +70° C within a short distance of the spinneret orifice and prior to winding up the filament; and

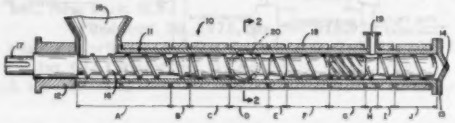


winding up the filament, said filament as wound up having an elastic recovery ratio of at least 70% from 50% extension and a work recovery ratio of at least 70% from 5% extension.

4,006,209
METHOD FOR ADDITIVE FEEDING

John J. Chiselko, Martinsville, and William H. Hulbert, Somerville, both of N.J., assignors to Egan Machinery Company, Somerville, N.J.

Filed Feb. 10, 1975, Ser. No. 548,283
Int. Cl.² D01F 1/02
U.S. Cl. 264—211 10 Claims



1. A process for the production of an extrudate of a resin and a solid particulate additive in a plastics extruder having a first barrel with a first bore, a resin feed opening adjacent to one end of the first barrel, a discharge orifice in the other end of the first barrel and a first rotating screw within the first bore having a melting stage and a low pressure section downstream of the melting stage, the steps comprising:

feeding the resin to the first screw through the resin feed opening;

conveying the resin by means of the first screw through the melting stage wherein the resin is melted and raised in pressure;

further conveying the molten resin through the low pressure section wherein the resin pressure is decreased;

simultaneously with feeding the resin and conveying the resin to the low pressure stage:

feeding the solid particulate additive to the feed opening of a second barrel having a second bore intersecting the first barrel at the low pressure section thereof;

conveying the solid particulate additive along the second bore to the intersection thereof with the low pressure section of the first barrel, by means of a second screw extending substantially the length of the second barrel; and

introducing the solid particulate additive at a controlled rate to the resin at the low pressure section of the first barrel by operation of the second screw;

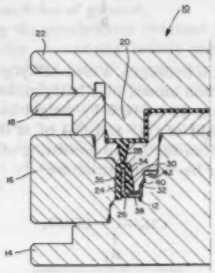
conveying and mixing the resin and the additive downstream of the low pressure section; and

discharging the extrudate of resin and additive through the discharge orifice.

4,006,210
METHOD OF MOLDING A SEAL WITH BALANCED PRESSURES ON A PREFORM

Dennis N. Denton, Bessemer City, N.C., assignor to Garlock Inc., Palmyra, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,169
Int. Cl.² B29C 5/00; B29D 3/00; B29G 3/00; B29H 9/00
U.S. Cl. 264—250 5 Claims



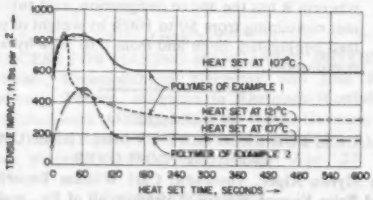
1. In a method for transfer molding a seal in which a cylindrical metal shell is supported in a mold cavity spaced from walls thereof, curable elastomer is introduced into said cavity and about said shell and cured, bonding the elastomer to said shell, the improvement comprising:

positioning said shell in said cavity and axially aligning said shell with plural sprue openings circumferentially spaced about said cavity so that elastomer flowing through each of said sprue openings is split into two streams by an edge portion of said shell, one stream flowing inside of the shell and the other of said streams flowing outside of said shell and introducing elastomer through said sprue openings, causing said elastomer to be split into streams flowing inside and outside of said shell, equalizing pressure against inner and outer surfaces thereof.

4,006,211
METHOD FOR IMPROVING IMPACT STRENGTH IN HIGH NITRILE POLYMERS BY STRETCHING AND HEAT SETTING

Ralph E. Isley, Northfield, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 438,615, Feb. 1, 1974, abandoned. This application May 27, 1975, Ser. No. 580,893
Int. Cl.² B29D 7/24
U.S. Cl. 264—291 9 Claims

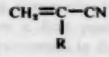


1. A process for improving the impact strength and dimensional stability of a polymer article consisting essentially of:

orienting a solvent-free, thermoformed polymer article containing less than 0.5% by weight of water, by stretching in more than one direction in a linear stretch ratio of about 1.5:1 to 5:1 in each direction of stretch within the temperature range of from about 85° to 150° C, then heat setting said oriented article within the orienting temperature range and for a period of from about 5 seconds to 2.5

minutes while the article is retained in its stretched condition, and wherein the polymer in said article is prepared by copolymerizing in an aqueous medium 100 parts by weight of:

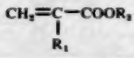
A. from about 60 to 90% by weight of at least one nitrile having the structure



wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen, and

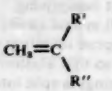
B. from about 40 to 10% by weight based on the combined weight of (A) and (B) of at least one member selected from the group consisting of:

1. an ester having the structure



wherein R_1 is hydrogen an alkyl group having from 1 to 4 carbon atoms, or a halogen, and R_2 is an alkyl group having from 1 to 6 carbon atoms.

2. an alpha -olefin having the structure



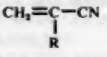
wherein R' and R'' are alkyl groups having from 1 to 7 carbon atoms,

3. a vinyl ether selected from the group consisting of methyl vinyl ether, ethyl vinyl ether, the propyl vinyl ethers, and the butyl vinyl ethers.

4. vinyl acetate, and

5. styrene, wherein said monomers are copolymerized in the presence of from 0 to 40 parts by weight of:

C. a rubbery polymer of a conjugated diene monomer selected from the group consisting of butadiene and isoprene and optionally a comonomer selected from the group consisting of styrene and a nitrile monomer having the structure



wherein R has the above designation, said rubber polymer containing from 50 to 100% by weight of polymerized conjugated diene and from 0 to 50% by weight of comonomer.

4,006,212

PROCESS FOR RECOVERY OF MOLYBDENUM AND RHENIUM FROM ORES

Allen Myron Alper, Towanda; Carl William Boyer, Wysox, and Brice Eugene Martin, Towanda, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Sept. 10, 1975, Ser. No. 612,097
Int. Cl.[3] C01G *39/00*, *47/00*
U.S. Cl. 423—49 **5 Claims**

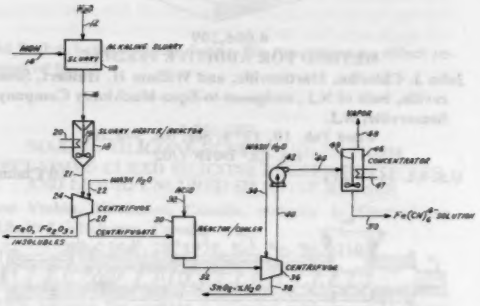
1. Process for recovery of molybdenum and rhenium values from sulfide ores containing said values, and impurities including contained silica, the process comprising fusing said ores with a molar excess of alkali metal carbonate of at least 15% over that required for the theoretical conversion of the molybdenum, rhenium and sulfur values to water soluble form, said fusing carried out in a nonoxidizing atmosphere at a temperature of from about 700°–950° C, until the resulting carbon dioxide evolution ceases, solidifying and leaching the fusion mass with water to separate the water soluble values from said impurities, characterized in that there is added to the fusion mass at least an amount of alumina needed to combine with contained silica to convert the contained silica to an insoluble form during fusion, whereby said insolubles are separated from the soluble alkali metal values during water leaching.

4,006,213

HALOGEN TIN ELECTRODEPOSITION BATH SLUDGE TREATMENT

Thomas W. Fisher; Stewart E. Rauch, Jr., both of Bethlehem, and Richard N. Steinbicker, Coopersburg, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed July 25, 1975, Ser. No. 598,979
Int. Cl.[2] C01G *19/02*
U.S. Cl. 423—92 **1 Claim**



1. A process for recovering stannic oxide, iron oxides and sodium ferrocyanide from sludge containing sodium hexafluorstannate, hydrated stannic oxide and ferri-ferrocyanide, which sludge has been derived from a halogen tin electroplating bath, comprising:

a. removing sludge from a halogen tin electro-plating bath,

b. diluting the electroplating sludge with water to form a slurry having a sludge weight percent of from about 10 to 20,

c. treating the slurry with an aqueous solution of a 1 to 10 molar alkali metal hydroxide while heating the slurry to a temperature up to 80° C with agitation until a constant pH within a range of 10 to 14 is attained, thereby forming a precipitate containing iron oxides and other insolubles,

d. separating said iron oxides suitable for use as high grade iron ore and said other residual insolubles from the slurry to provide a first clarified solution containing stannate and ferrocyamide ions,

e. treating the first clarified solution at a temperature of not more than 65° C with a 1 to 5 molar aqueous solution of an acid selected from the group consisting of hydrochloric and hydrofluoric acid until a final solution pH of about 6.5 to 7.5 is attained to precipitate said stannate ions as hydrated stannic oxide suitable for use as high grade tin ore,

f. removing the hydrated stannic oxide to leave a second clarified solution containing alkali metal ferrocyanide, and

g. concentrating the second clarified solution to an alkali metal ferrocyanide concentration of not less than 10 grams per liter suitable for reuse as an addition of alkali metal ferrocyanide to an electroplating bath.

4,006,214
PROCESS FOR THE RECOVERY OF FLUORINE FROM AN AQUEOUS SOLUTION

Erwin Moser, Rheinfelden, and Hans-Georg Morawe, Mannheim, both of Germany, assignors to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland

Filed Sept. 27, 1973, Ser. No. 401,216
Claims priority, application Switzerland, Sept. 29, 1972, 14291/72
Int. Cl.² C01D *5/00, 3/02;* **C02B** *1/56, 1/42*
U.S. Cl. 423—112 **8 Claims**

1. In a process for the treatment of aqueous solutions containing metal cations including aluminum ions and anions including sulphate and fluoride ions by means of an ion-exchange plant having ion exchange filter means,

the steps comprising

passing the aqueous solution through at least one strong acid cation-exchange filter means to remove substantially all of the metal cations including aluminum ions;

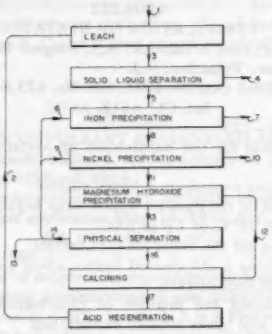
subsequently passing the emerging aqueous solution through a weak basic anion-exchanger filter means wherein the sulphate ions are selectively and nearly completely recoverably retained due to the greater affinity of said first weak basic anion-exchanger filter means for sulphate ions over fluoride ions;

passing the thus nearly completed desulfated aqueous solution through a second weak basic anion-exchange means wherein fluoride ions are recoverably retained.

4,006,215
RECOVERING IRON, NICKEL, OR COBALT FROM SULFATE SOLUTION

Rotrou Alan Hall, Mississauga; William Edward Jones, Burlington, and Kohur Nagaraja Subramanian, Mississauga, all of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Sept. 26, 1975, Ser. No. 616,926
Claims priority, application Canada, Apr. 2, 1975, 223652
Int. Cl.² C01G *49/02, 51/04, 53/04;* **C01F** *11/00*
U.S. Cl. 423—142 **6 Claims**



2. A method of processing a lateritic ore or concentrate containing magnesium and at least one metal value selection from the group iron, nickel and cobalt comprising the following steps:

I. leaching the ore or concentrate with sulfuric acid to form a leach solution containing sulfates of magnesium and the metal value(s);

II. separating the leach solution from undissolved ore or concentrate; III. aerating the leach solution to ensure that any dissolved iron is present in the ferric state,

IV. stripping at least one metal value from the each solution by adding magnesium hydroxide thereto to precipitate the hydroxide of the metal value;

V. separating the precipitated hydroxide from the stripped solution;

VI. treatment the stripped solution with lime at a temperature T° C which is at least 60° C for a period of t minutes wherein:

$t \geq 15$, where $T \geq 90°$ C., and

$t \geq 15 + (3/2)(90-T)$, where $60° C \leq T \leq 90°$ C.; while subjecting the solution to low energy agitation, thereby forming small particles of magnesium hydroxide and larger particles of gypsum;

VII. separating the precipitates obtained in step VI into a coarse fraction comprising mainly gypsum and a fine fraction comprising mainly magnesium hydroxide which can be recycled for performing the precipitation of step IV on fresh leach solution; and

VIII. heat treating the calcium sulfate separated in step VIII to regenerate lime which can be recycled to perform the precipitation of step VI, and acid gas for regenerating sulfuric acid.

4,006,216
PREPARATION OF NICKEL BLACK

Victor Alexander Ettel, Mississauga, and Marcel Alin Mosoiu, Toronto, both of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Jan. 26, 1976, Ser. No. 652,513
Claims priority, application Canada, July 28, 1975, 232312
Int. Cl.² C01G *53/04*
U.S. Cl. 423—592 **6 Claims**

1. A process for producing nickelic hydroxide comprising treating a nickeliferous solution with a base, which does not form a water-soluble complex with nickel, so as to raise the pH of the solution to at least about 8.0 and thereby precipitate nickel as a basic nickelous precipitate and introducing into the resulting nickeliferous slurry a mixture containing oxygen and a reducing agent selected from the group consisting of sulfur dioxide and metal sulfites and bisulfites, the oxygen content of the mixture being in excess of the stoichiometric amount needed to oxidize the reducing agent present therein, and the reducing agent being introduced into the slurry at a rate which does not substantially exceed the rate of consumption thereof.

4,006,217
PROCESS FOR MAKING MANGANESE DIOXIDE

Peter Faber, Grosswelzheim, Germany, and Jean Brenet, Strasbourg, France, assignors to Rheinisch-Westfallisches Elektrizitatswerk Aktiengesellschaft, Essen, Germany

Filed Apr. 23, 1975, Ser. No. 570,585
Claims priority, application Germany, Apr. 23, 1974, 2419490
Int. Cl.² C01G *45/02*
U.S. Cl. 423—605 **7 Claims**

1. A method for the preparation of manganese dioxide which comprises:

a. treating a manganese (III)-containing oxide with an acid perhalo solution and simultaneously with ozone to effect disproportionation of the manganese oxide thereby yielding manganese (II) ion in solution and manganese dioxide as a precipitate therein; and

b. removing the manganese dioxide precipitate from the manganese (II) solution of step (a).

4,006,218

POTENTIATED MEDICAMENTS

Tibor Sipos, Jackson, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 486,287, July 8, 1974, abandoned, which is a continuation-in-part of Ser. No. 285,682, Sept. 1, 1972, abandoned. This application July 14, 1975, Ser. No. 595,986

Int. Cl.[2] A61K *7/22, 31/045, 31/14;* **A01N** *9/24*

U.S. Cl. 424—54 **12 Claims**

1. An antimicrobial composition comprising at least about 0.001 percent by weight of an antimicrobial agent and at least about 0.05 percent by weight of a potentiator therefor, wherein said antimicrobial agent is a quaternary ammonium compound selected from the group consisting of domiphen bromide, domiphen chloride, domiphen fluoride, benzalkonium chloride, cetyl pyridinium chloride, dequalinium chloride, the cis isomer of 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride, cetyl trimethylammonium bromide, benzethonium chloride and methylbenzethonium chloride, and said potentiator is at least one primary, secondary or tertiary cyclohexylalkanol or alkylcyclohexyl alkanol selected from the group consisting of cyclohexylmethanol, 1-cyclohexylethanol, 2-cyclohexylethanol, 1-cyclohexyl-1-propanol, (cyclohexyl)-dimethylcarbinol, (4-isopropylcyclohexyl)-dimethylcarbinol, 3-cyclohexyl-1-propanol, 2-cyclohexyl-1-propanol, 1-cyclohexyl-2-propanol, 2-cyclohexyl-1,1-dimethylethanol, 2-cyclohexyl-2-methylpropanol, 2-cyclohexyl-1-methylpropanol, 2-cyclohexyl-1, 2-dimethylpropanol, 2-cyclohexyl-1, 1-dimethylpropanol, 3-cyclohexyl-2-methylpropanol, 3-cyclohexyl-1-methylpropanol, 3-cyclohexylbutanol, 3-cyclohexyl-2-methylbutanol and 3-cyclohexyl-1, 2-dimethylbutanol.

10. In the antimicrobial treatment of microbe contaminated surfaces including wounds, incisions and the like, containing bodily secretions and fluids, by applying to said surface a quaternary ammonium compound selected from the group consisting of domiphen bromide, domiphen chloride, domiphen fluoride, benzalkonium chloride, cetyl pyridinium chloride, dequalinium chloride, the cis isomer of 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride, cetyl trimethylammonium bromide, benzethonium chloride and methylbenzethonium chloride, the improvement comprising potentiating the activity of the quaternary ammonium compound by applying the same in conjunction with a potentiator which is a primary, secondary or tertiary cyclohexylalkanol or alkylcyclohexyl alkanol selected from the group consisting of cyclohexylmethanol, 1-cyclohexylethanol, 2-cyclohexylethanol, 1-cyclohexyl-1-propanol, (cyclohexyl)-dimethylcarbinol, (4,isopropylcyclohexyl)-dimethylcarbinol, 3-cyclohexyl-1-propanol, 2-cyclohexyl-1-propanol, 1-cyclohexyl-2-propanol, 2-cyclohexyl-1, 1-dimethylethanol, 2-cyclohexyl-2-methylpropanol, 2-cyclohexyl-1-methylpropanol, 2-cyclohexyl-1-2-dimethylpropanol, 2-cyclohexyl-1, 1-dimethylpropanol, 3-cyclohexyl-2-methylpropanol, 3-cyclohexyl-1-methylpropanol, 3-cyclohexylbutanol, 3-cyclohexyl-2-methylbutanol and 3-cyclohexyl-1, 2-dimethylbutanol.

4,006,219

COMPOSITION AND METHOD FOR COUNTERING EFFECTS OF ALCOHOL CONSUMPTION

John S. Upham, Clearwater; R. Scott Grybek, and Theodore R. Raulerson, Jr., both of Tampa, all of Fla., assignors to Ceres Pharmacal Company, Des Moines, Iowa

Continuation of Ser. No. 279,338, Aug. 10, 1972, abandoned. This application Jan. 29, 1975, Ser. No. 545,041

Int. Cl.[2] A61K *31/51, 31/455, 31/525, 37/48*

U.S. Cl. 424—94 **18 Claims**

1. A method of reducing the intoxicating effects associated with the consumption of beverage ethyl alcohol by a person which comprises orally administering to said intoxicated person a composition consisting essentially of at least about 30 mg. thiamine, at least about 30 mg. of riboflavin and at least about 10 mg. of niacin, and up to 2000 mg. of yeast in a dosage unit.

4,006,220

COMPOSITIONS AND METHODS USEFUL FOR REPAIRING DEPRESSED CUTANEOUS SCARS

Sheldon K. Gottlieb, 8708 Wandering Trail Drive, Potomac, Md. 20854

Filed June 4, 1975, Ser. No. 576,858

Int. Cl.[2] A61K *35/16, 37/00, 31/195*

U.S. Cl. 424—101 **19 Claims**

1. A composition useful for the repair of depressed cutaneous scars comprising at least one fibrin stabilizer and plasma in an amount to provide sufficient fibrin within a cavity formed under said scar and said fibrin stabilizer being present in an amount effective to maintain said fibrin within said cavity and thereby cause the build-up of collagen within said cavity.

4,006,221

DERIVATIVES OF DIUMYCIN A AND DIUMYCIN A'

William A. Slusarchyk, Belle Mead, and Frank Lee Weisenborn, Titusville, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 434,522, Jan. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 341,015, March 14, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,997

Int. Cl.[2] A61K *35/00*

U.S. Cl. 424—118 **4 Claims**

3. A hydrolysis product I of a Diumycin A methyl ester derivative wherein one or two of the methyl ester groups have been converted to the free acid, said product having $\lambda_{max}^{H_2O}$ (pH 5.0) 258 mμ, $E^{1\%}_{1cm}$=101, and IR spectrum as follows: IR(KBr) 3400, 2930, 1720, 1670, 1630(sh), 1530, 1430, 1370, 1325, 1260, 1210(sh), 1100(sh), 1065, 1035(sh), 965, and 880 cm^{-1}, the following elemental analysis: carbon 48.15; hydrogen, 6.75; nitrogen, 3.96; phosphorus, 1.84; oxygen (by difference), 39.30; O-methyl, 4.18; water of hydration, 6.92; and a melting point (dec.) 175°(tan), 177°(brown), 185°(black).

4,006,222

PURIFICATION OF NYSTATIN

Julio Metzger, East Brunswick, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 20, 1975, Ser. No. 623,840

Int. Cl.[2] A61K *35/00*

U.S. Cl. 424—123 **7 Claims**

1. A process for the purification of nystatin which comprises:

i. suspending nystatin in a lower alkanol;

ii. solubilizing the nystatin with a weak organic acid having a pK_a at 25° C of 1.0 to 5.0;

iii. filtering off the lower alkanol extract;

iv. combining a chlorinated hydrocarbon solvent with the lower alkanol extract;

v. neutralizing the mixture of chlorinated hydrocarbon solvent and lower alkanol extract; and

vi. adding water to precipitate purified nystatin.

4,006,223

DRUG COMPOSITION INTENDED FOR THE TREATMENT OF ACUTE, LETHAL AND CHRONIC RADIATION DISEASE

Irina Chitulescu, and Octav Costachel, both of Bucharest, Romania, assignors to Spitalul Clinic Filantropia Bucuresti, Bucharest, Romania

Filed Dec. 16, 1974, Ser. No. 532,861

Int. Cl.[2] A61K *37/00, 37/26*

U.S. Cl. 424—177 **5 Claims**

5. A pharmaceutical composition for the treatment of the acute lethal, or chronic radiation disease and its adverse effect in mammals, consisting of for one daily dose: 1×10^3 to $8 \times$

10^3 KIU of a kalikrein inhibitor polypeptide, 1 mg to 2×10^2 mg thiaminediphosphate, 0.1 mg to 10^2 mg of α_1 glycoproteic complex; 1 mg to 2×10^2 mg L tryptophane, 1 mg to 10^3 mg L-arginine and 0.1 mg to 10^3 mg of a lipoproteic complex.

4,006,224

METHOD AND AGENT FOR TREATING INFLAMMATORY DISORDERS OF THE GASTROINTESTINAL TRACT

John Fletcher Prudden, Upper Nyack, N.Y., assignor to Lescarden Ltd., Goshen, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,741
Int. Cl.² A61K *31/13, 31/70*
U.S. Cl. 424—180 **18 Claims**

1. A method of treating ulcerative colitis in a mammal afflicted with said condition which comprises administering to said mammal an effective amount for treating ulcerative colitis of a composition containing d-glucosamine.

4,006,225

METHOD OF USING REDUCTION PRODUCTS OF EVERNINOMICINS AS ANTIBACTERIAL AGENTS AND PHARMACEUTICAL COMPOSITIONS USEFUL THEREFOR

Ashit K. Ganguly, Upper Montclair, and Olga Sarre, Verona, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 411,548, Oct. 31, 1973, Pat. No. 3,915,956, which is a continuation-in-part of Ser. No. 377,344, July 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 315,263, Dec. 14, 1972, abandoned. This application Apr. 21, 1975, Ser. No. 570,117
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 **6 Claims**

1. The method of eliciting an antibacterial response in a warm-blooded animal having a susceptible bacterial infection, which comprises administering to said animal a non-toxic, antibacterially effective amount of a member selected from the group consisting of nitrosoeverninomicin B, nitrosoeverninomicin C, nitrosoeverninomicin D, hydroxylaminoeverninomicin B, hydroxylaminoeverninomicin C, hydroxylaminoeverninomicin D, nitrone derivatives of said hydroxylaminoeverninomicins B, C and D, and pharmaceutically acceptable salts thereof.

4,006,226

ANTICONVULSANT DIPHENYLSILANES

Donald R. Bennett, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 587,029, June 16, 1975, abandoned. This application Mar. 15, 1976, Ser. No. 666,822
Int. Cl.² A61K *31/695*
U.S. Cl. 424—184 **19 Claims**

1. A method of suppressing convulsions in a warm-blooded animal comprising administering to said animal a diphenylsilane of the formula ϕ_2SiX_2 in which X is a hydroxyl group or a radical which hydrolyzes in vivo to form the hydroxyl group, said silane being administered in amount effective to suppress convulsions in the animal.

4,006,227

COMPOSITIONS AND METHODS FOR FERTILITY CONTROL

Alfred J. Gallegos, Calzada General Anaya 209, and Vincente Cortes-Gallegos, Farallon 275, both of Mexico City, Mexico

Continuation-in-part of Ser. No. 416,212, Nov. 15, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,646
Int. Cl.² A61K *35/78*
U.S. Cl. 424—195 **17 Claims**

1. A composition for reducing progesterone in female mammals which includes a pharmaceutically acceptable carrier and an effective amount of progesterone-regulating substance obtainable by aqueous extract of *Montanoa tomentosa* leaves and stems, said extract being produced by heat and a standard extraction ratio of about 75 grams to 150 grams of *Montanoa tomentosa* per liter of water at about 100° C.

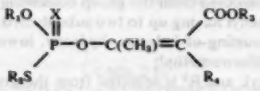
4,006,228

PESTICIDALLY ACTIVE THIO- AND DITHIOPHOSPHORIC ACID ESTERS

Ernst Beriger, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,123
Claims priority, application Switzerland, Sept. 20, 1974, 12794/74; July 17, 1975, 9340/75
Int. Cl.² A01N *9/36*; C07F *9/02*
U.S. Cl. 424—212 **7 Claims**

1. Thio- and dithiophosphoric acid esters corresponding to the formula



wherein
R_1 is ethyl,
R_2 is n-propyl,
R_3 is methyl, ethyl or isopropyl,
R_4 is phenyl, methoxycarbonylmethyl or ethoxycarbonylmethyl, and
X is oxygen or sulphur.

6. A composition for the control of insects and members of the order Acarina, which composition comprises an insecticidally or acaricidally effective amount of a thio- or dithiophosphoric acid ester as claimed in claim 1, together with a suitable carrier therefor.

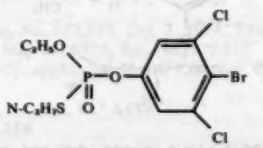
4,006,229

INSECTICIDAL AND ACARICIDAL TRIHALOPHENYL THIOPHOSPHATES

Jozef Drabek, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 192,477, Oct. 26, 1971, Pat. No. 3,919,362. This application July 21, 1975, Ser. No. 597,805
Claims priority, application Switzerland, Oct. 26, 1970, 15775/70; Sept. 7, 1971, 13101/71
Int. Cl.² A01N *9/36*
U.S. Cl. 424—225 **4 Claims**

1. An insecticidal and acaricidal composition comprising an insecticidally and acaricidally effective amount of a compound of the formula



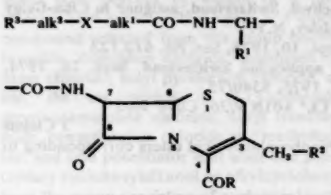
together with a suitable inert carrier therefor.

4,006,230
7-D-(α-ACYLAMINO-ARYLACETAMIDO)-CEPHALOSPORANIC ACID DERIVATIVES

David A. Cox, and Braham Shroot, both of Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 504,381, Sept. 9, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,297
Claims priority, application United Kingdom, Sept. 13, 1973, 43033/73
Int. Cl.² C07D *501/24, 501/32*
U.S. Cl. 424—246 18 Claims

1. A compound for the formula:



wherein R^1 is selected from the group consisting of phenyl and substituted phenyl having up to two substituents selected from the group consisting of halogen, hydroxy, lower alkyl, lower alkoxy and trifluoromethyl;

R is hydroxyl; and R^2 is selected from the group consisting of hydrogen, hydroxy and acetoxy;

R^3 is selected from the group consisting of sulpho, COR^4 wherein R^4 is selected from the group consisting of hydrogen and R^4 wherein R^4 is selected from the group consisting of lower alkyl, 5-indanyl and substituted phenyl wherein the substituent is selected from the group consisting of lower alkyl and lower alkoxy; $CONR^5R^6$, wherein R^5 and R^6 are each lower alkyl;

X is selected from the group consisting of oxygen, sulphur, carbonyl, sulphinyl, sulphonyl, and $—NR^7—$, wherein R^7 is selected from the group consisting of hydrogen, lower alkyl, allyl and benzyl; and alk^1 and alk^2 each represent a divalent saturated aliphatic hydrocarbon group having from 1 to 3 carbon atoms; and pharmaceutically acceptable salts thereof.

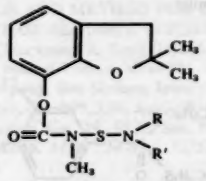
15. A pharmaceutical composition comprising a compound according to claim 1 and a pharmaceutically carrier.

4,006,231
N-AMINOSULFENYLATED DERIVATIVES OF CARBOFURAN

Allan Lindsay Black, Dundas, Australia, and Tetsuo Roy Fukuto, Riverside, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 378,700, July 12, 1973, abandoned. This application June 6, 1974, Ser. No. 476,767
Int. Cl.² C07D *307/86;* A01N *9/12*
U.S. Cl. 424—248.5 12 Claims

1. A compound of the formula



where R and R′ may be the same or different and each is alkyl of 1 to 8 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, or benzyl, or R and R′ taken together with the nitrogen form a pyrollidine, piperidine, morpholine, piperazine, or hexahydroazepine heterocyclic ring which may have one or more substituents selected from lower (1 to 4 carbons) alkyl, benzyl, phenyl, or lower alkoxy, with the provisos that (1) the total number of carbon atoms in said substituents is 1 to 8 inclusive, (2) the number of alkoxy substituents on the heterocyclic ring is zero or one, and (3) the number of substituents on a carbon adjacent to the nitrogen atom bonded to the sulfenyl sulfur is zero or one.

11. An insecticidal composition comprising an insecticidally effective amount of a compound of claim 1 in admixture with an carrier.

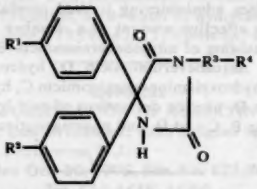
4,006,232
THERAPEUTIC METHOD OF TREATING CARDIAC ARRHYTHMIAS UTILIZING 3-SUBSTITUTED DIPHENYLHYDANTOINS

Shin Hayao, Tokyo, Japan; Herbert John Havera, Edwardsburg, Mich., and Wallace Glenn Strycker, Goshen, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Division of Ser. No. 381,021, July 20, 1973, Pat. No. 3,892,748. This application Nov. 15, 1974, Ser. No. 524,297
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 17 Claims

1. A method of treating a cardiac arrhythmia in a mammal which comprises:

administering to said mammal an antiarrhythmic effective amount of a compound selected from the group consisting of



and a pharmacologically acceptable, nontoxic acid addition salt thereof, wherein:

R^1 and R^2 are selected from the group consisting of hydrogen, halogeno, loweralkyl of 1 to 3 carbon atoms, loweralkoxy of 1 to 3 carbon atoms, amino, and nitro;

R^3 is selected from the group consisting of ethylene and trimethylene, and

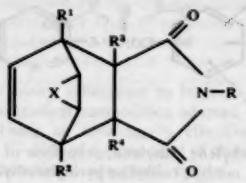
R^4 is selected from the group consisting of 4-phenyl-1-piperidyl, 4-hydroxy-4-phenyl-1-piperidyl, 4-phenyl-1,2,3,6-tetrahydropyridyl, and 4-phenyl-1-piperazinyl.

4,006,233
N-(PYRIMIDINYL)-TRICYCLO[3(OR 4).2.2.0$^{2,4 \text{ or } 3}$]-NON (OR DEC)ENEDICARBOXIMIDES

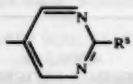
Kenneth L. Shepard, Ambler, and William J. Paleveda, Jr., Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 511,961, Oct. 4, 1974, abandoned. This application May 9, 1975, Ser. No. 575,918
Int. Cl.² C07D *403/04*
U.S. Cl. 424—251 4 Claims

1. A compound having the formula:



wherein:
R^1, R^2, R^3 and R^4 are hydrogen;
= is $-CH_2-$ or $-CH=CH-$;
R is



wherein R^5 is acetammido, or amino; or a non-toxic pharmaceutically acceptable salt thereof.

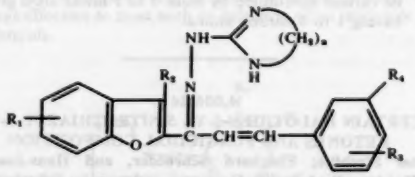
4,006,234

SUBSTITUTED 2-BENZOFURANYL PROPENONES AS ANTI-TUBERCULAR AGENTS

Ralph Grassing Child, Pearl River, N.Y.; Raymond George Wilkinson, Montvale, and Andrew Stephen Tomcufcik, Old Tappan, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 534,029, Dec. 18, 1974, Pat. No. 3,931,157. This application Dec. 29, 1975, Ser. No. 645,065
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 **4 Claims**

1. A method for the treatment of tubercular infections in a warm-blooded animal which comprises administering to said animal an anti-tubercular effective amount of an anti-tubercular agent of the formula:



wherein R_1 and R_3 may be the same or different and are selected from the group consisting of hydrogen, chloro, bromo, fluoro, C_1–C_4 alkoxy, phenyl, C_1–C_4 alkyl, and C_1–C_4 alkyl thio, R_2 is selected from the group consisting of hydrogen, C_1–C_4 alkyl and phenyl, R_4 is hydrogen, C_1–C_4 alkyl or chloro and when R_3 and R_4 are present on adjacent carbon atoms, they may represent $-O-CH_2-O-$, n is 2, 3 or 4 or an acid addition salt thereof.

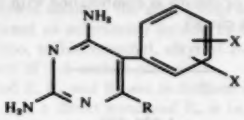
4,006,235

TREATING CNS LYMPHOMA

Dwight R. Stickney; William S. Simmons; Charles A. Nichol; George H. Hitchings, all of Durham, and Gertrude B. Elion, Chapel Hill, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 344,179, March 23, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,452
Int. Cl.² A61K *31/505*
U.S. Cl. 424—251 **6 Claims**

1. A method of treating a mammal infected with CNS lymphoma which comprises internally administering to the infected mammal an effective non-toxic CNS lymphoma treatment amount of a compound of Formula I



(I)

where R is lower alkyl containing 1 to 4 carbon atoms and X is a halogen atom or a pharmaceutically acceptable salt thereof.

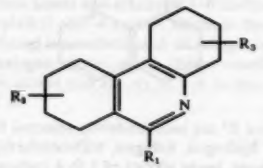
4,006,236

SUBSTITUTED OCTAHYDROPHENANTHRIDINE PESTICIDES

Michael Stanley Schrider, South Bound Brook, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 4, 1975, Ser. No. 601,732
Int. Cl.² A01N *9/22*
U.S. Cl. 424—258 **18 Claims**

1. A method for the control of insects and Acarina comprising, contacting the larvae, nymphs or adults of said insects and Acarina with an insecticidally and Acaricidally effective amount of a compound represented by the following formula:



wherein R_1 is a member selected from the group consisting of C_1–C_{10} alkyl straight chain or branched, C_2–C_7 alkenyl straight chain or branched, C_3–C_8 alkynyl straight chain or branched, and C_3–C_7 cycloalkyl, and R_2 and R_3 are hydrogen or methyl.

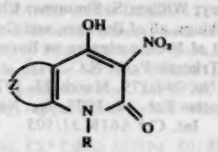
4,006,237

TETRAHYDROCARBOSTYRIL DERIVATIVES FOR THE PROPHYLAXIS OF ASTHMA, HAYFEVER AND RHINITIS

Derek Richard Buckle, Redhill; Barrie Christian Charles Cantello, Horsham, and Harry Smith, Maplehurst near Horsham, all of England, assignors to Beecham Group Limited, Germany

Division of Ser. No. 512,949, Oct. 7, 1974. This application May 21, 1975, Ser. No. 579,416
Claims priority, application United Kingdom, Oct. 11, 1973, 47508/73
Int. Cl.² A61K *31/47*
U.S. Cl. 424—258 **48 Claims**

1. A pharmaceutical composition in a form suitable for administration to humans which comprises a compound of the formula



(II)

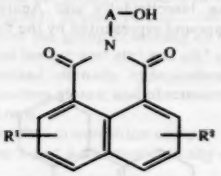
or a pharmaceutically acceptable salt thereof, wherein
R is hydrogen or lower alkyl, and
Z is a cyclohexyl ring fused to the pyridone ring
in an amount sufficient to be effective for the prophylaxis of of asthma, hayfever or rhinitis in combination with a pharmaceutically acceptable carrier.

4,006,238
USE OF 2-(HYDROXYALKYL)-1H-BENZ[DE]ISOQUINOLINE-1,3(2H)-DIONES AS ANTI-ALLERGY AGENTS

Peter C. Wade, Pennington, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 28, 1975, Ser. No. 608,433
Int. Cl.² A61K *31/47*
U.S. Cl. 424—258 **10 Claims**

1. The method of treating an allergic mammalian host which comprises administering an effective amount of an antiallergy pharmaceutical composition comprising a pharmaceutically acceptable carrier and an anti-allergy compound or a mixture of compounds having the formula



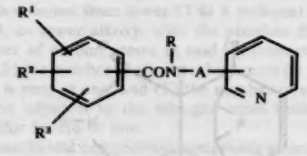
wherein R^1 and R^2 are independently selected from the group consisting of hydrogen, halogen, trifluoromethyl, lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, nitro, amino, and cyano; and A is a straight or branched chain alkylene of 1 to 8 carbons.

4,006,239
BENZOIC ACID AMIDES FOR MYCOBACTERIUM INFECTIONS

Karl Heinrich Mayer, Opladen-Quettingen; Hans-Joachim Kabbe, Leverkusen, and Hinrich Otten, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Apr. 2, 1975, Ser. No. 564,224
Claims priority, application Germany, Apr. 11, 1974, 2417763
Int. Cl.² A61K *31/44*
U.S. Cl. 424—263 **14 Claims**

1. The method of combatting systemic Mycobacterium infections in humans and other animals which comprises administering parenterally or orally to said human or animal from about 20 to about 200 mg/kg of body weight daily of a compound of the formula:



wherein A is methylene, ethylene, propylene or benzylidene;
R is hydrogen, methyl, benzyl or pyridylmethyl; and each of R^1, R^2 and R^3 is selected from the group consisting of hydrogen, hydroxy, alkoxy of 1 to 4 carbon atoms, alkanoyloxy of 2 to 4 carbon atoms, amino, alkanoylamido of 2 to 4 carbon atoms, carbalkoxyamido of 3 to 5 carbon atoms, chloro, bromo, alkyl of 1 to 4 carbon atoms, nitro, trifluoromethyl and cyano provided that one of R^1, R^2 and R^3 is hydroxy, alkoxy, alkanoyloxy, amino, alkanoylamido or carbalkoxyamido.

4,006,240
ALCOHOL AVERSION PROCESS BY ENZYME INHIBITION

Andrew K. S. Ho, c/o Dept. of Basic Sciences, Peoria School of Medicine University of Illinois, Peoria, Ill. 61606, and Benjamin Kissin, c/o Kings County Addictive Disease Hospital, 600 Albany Ave., Brooklyn, N.Y. 11203

Filed Mar. 19, 1975, Ser. No. 560,018
Int. Cl.² A61K *31/44*, *31/14*
U.S. Cl. 424—263 **5 Claims**

1. The method for inducing alcohol aversion in a mammal having an inherent propensity for excessive alcohol consumption which comprises systemic administration to said mammal of a non-toxic dose effective to cause alcohol aversion of a specific physiologically acceptable inhibitor of the enzyme choline acetylase wherein said inhibitor is a compound selected from the group consisting of

ArCH=CCHet,

ArC ≡ CHet,

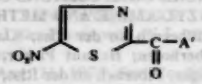
the pharmaceutically acceptable acid addition and quaternary ammonium salts of each, acryloylcholine, and acetylsecohemicholinium-3, wherein
Ar is phenyl, napthyl, indanyl, indolyl, each of which may be substituted by from 0 to 2 substitutents selected from the group consisting of fluorine, chlorine, bromine, iodine, lower alkyl having 1 to 4 carbon atoms, and lower alkoxy having 1 to 4 carbon atoms,
Het is 2 -pyridyl, 3-pyridyl, or 4-pyridyl, each of which may be carbon substituted by from 0 to 1 lower alkyl groups having 1 to 4 carbon atoms.

4,006,241
CERTAIN HALOTHIEN-2-YL 5-NITROTHIAZOL-2-YL KETONES AND FUNGICIDAL COMPOSITION

Peter Strehlke; Eberhard Schroeder, and Hans-Joachim Kessler, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Continuation-in-part of Ser. No. 265,462, June 23, 1972, Pat. No. 3,830,826. This application July 17, 1974, Ser. No. 489,161
Claims priority, application Germany, July 18, 1973, 2337153
Int. Cl.² C07D *417/00*
U.S. Cl. 424—270 **5 Claims**

1. A 2-acyl-5-nitrothiazole of the formula



wherein A' is thienyl substituted by bromo or iodo.

5. A pharmaceutical composition adapted or topical application comprising an antifungally effective concentration from about 0.1 – 10% of a compound of claim 1 in admixture with a pharmaceutically acceptable carrier.

4,006,242
CERTAIN BENZOTHIAZOLES USED IN THE TREATMENT OF HELMINTHIASIS

Mohammad Mehdi Nafissi-Varchei, North Caldwell, N.J., assignor to Schering Corporation, Kenilworth, N.J.

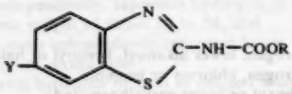
Continuation-in-part of Ser. No. 381,112, July 18, 1973, abandoned. This application Apr. 25, 1975, Ser. No. 571,875

Claims priority, application Switzerland, July 8, 1974, 9468/74

Int. Cl.² A01N 9/20; A61K 31/425

U.S. Cl. 424—270 **6 Claims**

1. A method of treating helminthiasis in mammals which comprises administering to a mammal suffering therefrom an anthelmintically effective quantity of a benzothiazole of the formula



wherein Y is ethoxy or n-propoxy and R is methyl or ethyl.

4,006,243
AMINO-, MERCAPTO- AND -OXY-SUBSTITUTED-PHENYL AND -PHENALKYL IMIDAZOLES

Peter Strehlke; Hans-Joachim Kessler, and Ulrich Redmann, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

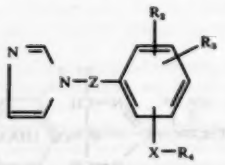
Filed Apr. 11, 1975, Ser. No. 567,361

Claims priority, application Germany, Apr. 11, 1974, 2418502; Mar. 7, 1975, 2510781; Mar. 6, 1975, 2510130

Int. Cl.² C07D 233/60, 233/56

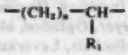
U.S. Cl. 424—273 **136 Claims**

134. A pharmaceutical composition adapted for the treatment of fungal, bacterial and yeast infections in animals comprising, in admixture with a pharmaceutical carrier, an amount effective to treat such an infection of an imidazole of the formula



wherein R_2 and R_3 each are hydrogen atoms, alkyl of 1–10 carbon atoms, alkoxy of 1-6 1-6 atoms, alkylmercapto of 1–6 carbon atoms, halogen atoms or nitro, or collectively are C_4H_4; and

I. X is NH, Z is a direct bond or

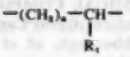


wherein n is the integer 0, 1 or 2 and R_1 is a hydrogen atom, alkyl of 1–6 atoms, phenyl or phenyl substituted by one to three of halogen atoms, alkyl of 1–6 carbon atoms, alkoxy of 1–6 carbon atoms and nitro groups; and R_4 is (a) phenyl or phenyl substituted by one to three of halogen atoms, nitro, trifluormethyl, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms, or (b) phenylalkly of 1–4 carbon atoms in the alkyl group wherein phenyl is unsubstituted or substituted by one to three of halogen atoms, nitro, trifluoromethyl, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms; or

II. X is S and Z, R_1 and R_4 are as defined in I, above, or

III. X is O, Z is a direct bond and R_4 is (a) alkenyl of 3–6 carbon atoms, (b) alkinyl of 3–6 carbon atoms, (c) phenyl or phenyl substituted by one to three of halogen atoms, nitro, trifluoromethyl, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms, or (d) phenylalkyl of 1–4 carbon atoms in the alkyl group wherein phenyl is unsubstituted or substituted by one to three of halogen atoms, nitro, trifluoromethyl, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms; or (e) alkyl of 1–6 carbon atoms; or

IV. X is O, Z is



wherein n is the integer 0, 1 or 2 and R_1 is phenyl or phenyl substituted by one to three of halogen atoms, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms, and R_4 is phenylalkyl of 1–4 carbon atoms in the alkyl group wherein phenyl is unsubstituted or substituted by one to three of halogen atoms, nitro, trifluoromethyl, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms; or

V. X is O, Z is

wherein R_1 is H or alkyl of 1–6 carbon atoms, and R_4 is phenyl or phenyl substituted by one to three of halogen atoms, nitro, trifluoromethyl, alkyl of 1–6 carbon atoms and alkoxy of 1–6 carbon atoms; or

VI. X is O, Z is

wherein R_1 is a hydrogen atom or alkyl of 1–6 carbon atoms, and R_4 is alkenyl of 3–6 carbon atoms or alkinyl of 3–6 carbon atoms; or a physiologically acceptable salt thereof.

4,006,244
BENZO-1,3-DIOXOLAN-4-YL N-METHYL-N-PHENYLMERCAPTO-CARBAMATES

Peter Siegle, Cologne; Engelbert Kuhle, Bergisch-Gladbach; Gerhard Zumach; Ingeborg Hammann, both of Cologne, and Bernhard Homeyer, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

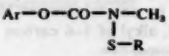
Filed May 23, 1975, Ser. No. 580,380

Claims priority, application Germany, June 15, 1974, 2428924

Int. Cl.² A61K *31/34*

U.S. Cl. 424—282 8 Claims

1. A benzo-1,3-dioxolan-4-yl N-methyl-N-phenylmercapto-carbamate of the formula



in which

Ar is benzo-1,3-dioxolan-4-yl and

R is phenyl or phenyl substituted by at least one of halogen, nitro, alkyl and trifluoromethyl.

6. An insecticidal composition containing as active ingredient an insecticidally effective amount of a compound according to claim 1 in admixture with a diluent.

7. A method of combating insect pests which comprises applying to the pests or a habitat thereof an insecticidally effective amount of a compound according to claim 1.

4,006,245
CHEMICAL COMPOUNDS

Joachim Augstein, Linford; David Carter, and Thomas Brian Lee, both of Loughborough, all of England, assignors to Fisons Limited, England

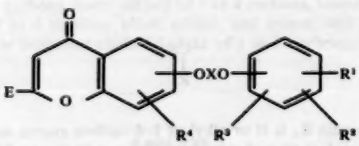
Division of Ser. No. 276,798, July 31, 1972, Pat. No. 3,882,148. This application Jan. 29, 1975, Ser. No. 545,309

Claims priority, application United Kingdom, July 29, 1971, 35605/71

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 1 Claim

1. A pharmaceutical composition for antoganizing the slow reacting substance of anaphylaxis which comprises a compound of the formula:



wherein

X is straight chain alkylene containing 3 to 7 carbon atoms and is unsubstituted or is substituted by hydroxy,

R^1, R^2 and R^3 are the same or different and are hydrogen, hydroxy, methoxy, benzyloxy, acetyl, acetylamino, allyl or propyl, provided that at least one of R^1, R^2 and R^3 are other than hydrogen or hydroxy,

R^4 is hydrogen, allyl or propyl,

and

E is a carboxy group or pharmaceutically acceptable salt thereof, as active ingredient,

in an amount effective to antagonize the slow reacting substance of anaphylaxis,

in admixture with a pharmaceutically acceptable adjuvant, diluent or carrier.

4,006,246
PHARMACEUTICAL COMPOSITIONS CONTAINING AN AMINOBENZYL-AMINE AND METHOD OF USE

Johannes Keck, Biberach an der Riss; Klaus-Reinhold Noll, Warthausen-Oberhofen; Helmut Pieper, Biberach an der Riss; Gerd Kruger, Biberach an der Riss, and Sigfrid Puschmann, Biberach an der Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

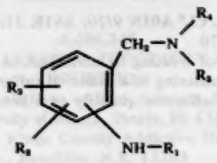
Division of Ser. No. 458,099, April 5, 1974, Pat. No. 3,950,393. This application Jan. 15, 1976, Ser. No. 649,481

Claims priority, application Germany, Apr. 13, 1973, 2318636; Jan. 23, 1974, 2402989

Int. Cl.² A61K *31/19*, *31/24*, *31/135*

U.S. Cl. 424—309 6 Claims

1. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective anti-ulcerogenic, secretolytic, antitussive or antiatelectasis factor production stimulating amount of a compound of the formula



wherein

R_1 is hydrogen, lower alkanoyl, benzoyl or halobenzoyl,

R_2 is hydrogen, chlorine or bromine,

R_3 is carboxyl or lower carbalkoxy, and

R_4 and R_5 are each hydrogen, alkyl of 1 to 5 carbon atoms, mono- or di-hydroxy-(alkyl of 1 to 5 carbon atoms), alkenyl of 2 to 4 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, mono- or di-hydroxy-(cycloalkyl of 5 to 7 carbon atoms) or benzyl,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,006,247
UNSATURATED IMIDAZOLINES

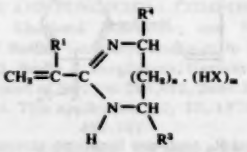
Hans Peter Panzer, Stamford; Michael Niall Desmond O'Connor, Norwalk, and Louis J. Baccei, Newington, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 6, 1974, Ser. No. 467,331

Int. Cl.² C07D *49/34*

U.S. Cl. 260—309.6 5 Claims

1. A compound having the formula



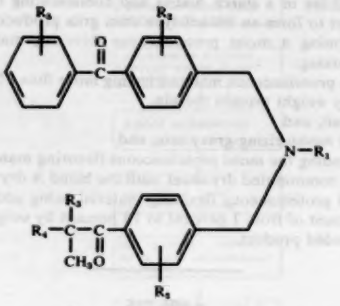
wherein *m* is 0 or 1, *n* is 0, X is an anion, R′ is hydrogen or methyl and R^3 and R^4 are, individually, hydrogen, alkyl (C_1–C_4), aryl (C_6–C_{10}), aralkyl (C_7–C_{11}) or alkaryl (C_7–C_{11}).

4,006,248
ALKYL-p-PIVALOYLBENZYLAMINOMETHYL-BENZOPHENONES

Jeffrey Nadelson, Lake Parsippany, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 21, 1975, Ser. No. 606,459
Int. Cl.² A01N 9/20; C07C 97/10
U.S. Cl. 424—316 9 Claims

1. A compound of the formula



where

R_1 represents lower alkyl having 1 to 4 carbons atoms, and

R_2 each independently, represent hydrogen or halo having an atomic weight of about 19 to 36, and

R_3 and R_4 each independently represent lower alkyl having 1 to 2 cabon atoms, and

R_5 represents hydrogen or halo as defined above,

or a pharmaceutically acceptable salt thereof.

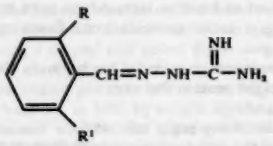
9. A method of treating lipidemia which comprises administering to a mammal in need of said treatment a hypolipidemic effective amount of a compound of claim 1 and a pharmaceutically acceptable carrier therefor.

4,006,249
SYSTEMIC TREATMENT OF PSORIASIS

William R. Porter, Etobicoke; John K. McKenzie, and Paul A. Mitenko, both of Winnipeg, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,603
Int. Cl.² A61K 31/155
U.S. Cl. 424—326 9 Claims

1. A process for ameliorating the clinical manifestations of psoriasis in a human suffering from psoriasis which comprises administering to said human an effective amount of a compound of the formula:



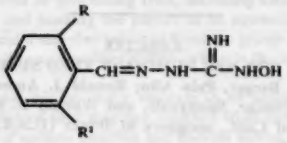
wherein R and R^1 are independently chlorine and fluorine, and the pharmacologically acceptable acid addition salts thereof.

4,006,250
SYSTEMIC TREATMENT OF PSORIASIS

Scott J. Childress, Philadelphia, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,647
Int. Cl.² A61K 31/155
U.S. Cl. 424—326 12 Claims

1. A process for ameliorating the clinical manifestations of psoriasis in a human suffering from psoriasis which comprises administering to said human an effective amount of a compound of the formula:



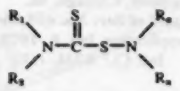
wherein R and R^1 are independently chlorine and fluorine, and the pharmacologically acceptable acid addition salts thereof.

4,006,251
BACTERICIDAL AND FUNGICIDAL COMPOSITION CONTAINING THIOCARBANYL SULFENAMIDES

Ray D. Taylor, Brecksville, and Robert A. Krueger, Cuyahoga Falls, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed July 9, 1973, Ser. No. 377,419
Int. Cl.² A01N 9/20
U.S. Cl. 424—328 4 Claims

1. A composition having bactericidal and fungicidal properties containing (A) as an active ingredient 21 from about 0.01 percent to about 95 percent by weight based upon the weight of the composition of a thiocarbamylsulfenamide



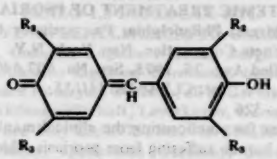
selected from the group consisting of N,N-dimethylthiocarbamyl-N′,N′-dicyclohexylsulfenamide and N,N-diethylthiocarbamyl-N′,N′-dicyclohexylsulfenamide, and (B) water as a carrier.

4,006,252
METHODS AND COMPOSITIONS FOR REDUCING PLASMA LIPID LEVELS

Sidney I. Lerner, Cincinnati, Ohio, assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 647,582, May 8, 1967, abandoned, which is a division of Ser. No. 324,255, Nov. 18, 1963, abandoned. This application May 12, 1972, Ser. No. 252,582
Int. Cl.² A61K 31/12
U.S. Cl. 424—331 6 Claims

1. A method of lowering plasma lipid levels in a mammal which comprises internally administering to said mammal from about 0.25 mg to about 1.0 grams of a compound having the formula



wherein R_2 is alpha-branched alkyl of from 3–12 carbon atoms and R_3 is alkyl of from 1–12 carbon atoms; per kilogram of body weight per day.

4,006,253

PROCESS FOR NPN RUMINANT FEED SUPPLEMENT

Kenneth L. Berger, Palo Alto; Ronald J. Amen, Saratoga; Jorge J. Nassar, Sunnyvale, and William B. Benken, San Jose, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Dec. 8, 1975, Ser. No. 638,718

Int. Cl.² A23K *1/14*

U.S. Cl. 426—69 **13 Claims**

1. A process for the preparation of an NPN ruminant feed supplement, which process comprises:

a. adding cellulose-containing commodity portionwise to a mixture of a concentrated mineral acid and urea said mixture having a pH less than 1, to cause a substantial dissolution of said cellulose containing commodity

b. diluting the above mixture with water and heating at an elevated temperature for a period of time sufficient to cause the chemical binding of at least 50% of theoretical of the urea, based upon the monosaccharide potential of said cellulose-containing commodity and a 1:1 molar ratio of binding of urea to monosaccharide, and

c. adjusting the pH of the mixture obtained in step (b) to between about 3 and 8.

4,006,254

PROTEIN SUPPLEMENTED, FLAVORED INSTANT GRITS

Bruce George Gralak, Carpentersville, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Continuation-in-part of Ser. No. 408,864, Oct. 23, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 597,505

Int. Cl.² A23L *1/30*

U.S. Cl. 426—72 **12 Claims**

1. A process for producing a fortified, nutritional instant-type food product which upon the addition of water and without need for heating to boiling temperatures acquires the flavor and texture characteristics of cooked corn grits, said process comprising the steps:

A. admixing

1. corn grits;

2. water, said water being added in an amount sufficient to cause the moisture content to be from 50 percent to 90 percent by weight of the total mixture;

3. an edible polysaccharide gum capable of rehydrating rapidly with the addition of water, said gum being added in an amount of 0.5 to 3.5 percent by weight of the finished corn grits product;

4. an emulsifier comprising a member selected from the group consisting essentially of polyoxyethylene sorbitan monostearate, polyoxyethylene sorbitan mono-oleate, glyceryl monostearate, and a mixture of monoglycerides and diglycerides of edible fats, oils, and fat forming fatty acids, said emulsifier being added in an amount of from 10 parts per million to 2 percent by weight based on the weight of the corn grits when less than 10 percent by weight of the grits have a particle size sufficient to pass through a U.S. No. 25 screen, and said emulsifier being present in an amount of from 50 parts per million to 2 percent by weight based on the weight of the corn grits when greater than 10 percent by weight of the grits have a particle size sufficient to pass through a U.S. No. 25 screen; and

5. a mixture of vitamins and antioxidant until the total admixture is a slurry;

B. heating the above mixture until the temperature of the mixture is above 71° C but not exceeding a point at which degradation of the grits occurs;

C. drying the heated mixture in the form of a thin sheet on a drum drier;

D. collecting the dried sheet of product containing discrete particles in a starch matrix and comminuting the dried sheet to form an instant-type corn grits product;

E. forming a moist proteinaceous flavoring material by admixing:

1. a proteinaceous material having more than 15 percent by weight protein therein,

2. salt, and

3. a moisturizing gravy mix; and

F. blending the moist proteinaceous flavoring material with the comminuted dry sheet until the blend is dry and with said proteinaceous flavoring material being added in an amount of from 1 percent to 15 percent by weight of the blended product.

4,006,255

PROCESS FOR PREPARING PROTEIN SUPPLEMENTED, FLAVORED INSTANT GRITS

Bruce G. Gralak, Carpentersville, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Continuation-in-part of Ser. No. 408,865, Oct. 23, 1973, abandoned. This application Jan. 8, 1975, Ser. No. 597,506

Int. Cl.² A23L *1/30*

U.S. Cl. 426—72 **9 Claims**

1. A process for producing a fortified, nutritious instant-type food product which upon the addition of water and without need for heating to boiling temperatures acquires the flavor and texture characteristics of cooked corn grits, said process consisting of the steps:

A. admixing

1. corn grits;

2. water, said water being added in an amount sufficient to cause the moisture content to be from 30 percent to 90 percent by weight of the total mixture;

3. an edible polysaccharide gum capable of rehydrating rapidly with the addition of water, said gum being added in an amount of from 0.5 to 3.5 percent by weight of the finished corn grits product; and

4. a mixture of vitamins and antioxidant until the total admixture is a slurry;

B. rapidly heating the above mixture to a temperature of from 71° to 100° C. said heating being accomplished within 30 seconds of the time the corn grits, water, and gum are substantially mixed together;

C. immediately drying the heated mixture in the form of a thin sheet on a drum drier, said drying being substantially accomplished within 2.5 minutes of the time the corn grits, water, and gum are substantially mixed together;

D. collecting the dried sheet of product containing discrete particles in a starch-gum matrix and comminuting the dried sheet to form an instant-type corn grits product;

E. forming a moist proteinaceous flavoring material by admixing:

1. a proteinaceous material having more than 15 percent by weight protein therein;

2. salt, and

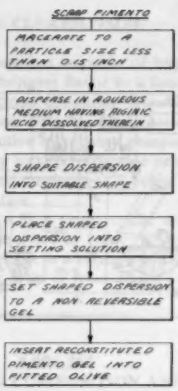
3. a moisturizing gravy mix; and

F. blending the moist proteinaceous flavoring material with the comminuted dry sheet until the blend is dry and with said proteinaceous flavoring material being added in an amount of from 1 percent to 15 percent by weight of the blended product.

4,006,256
OLIVE STUFFED WITH RECONSTITUTED PIMENTO AND METHOD OF PRODUCTION

George C. Kyros, West Chester, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Filed July 11, 1975, Ser. No. 595,153
Int. Cl.² A23B 7/10; A23L 1/04
U.S. Cl. 426—102 45 Claims


SCRAP PIMENTO
MACERATE TO A PARTICLE SIZE LESS THAN 0.15 INCH
DISPERSE IN AQUEOUS MEDIUM HAVING ALGINIC ACID DISSOLVED THEREIN
SHAPE DISPERSION INTO SUITABLE SHAPE
PLACE SHAPED DISPERSION INTO SETTING SOLUTION
SET SHAPED DISPERSION TO A NON REVERSIBLE GEL
INSERT RECONSTITUTED PIMENTO GEL INTO PITTED OLIVE

1. A process for automatically stuffing olives with reconstituted pimento comprising:

a. macerating natural pimento until the macerated particle size will form a dispersion in an aqueous medium and the average particle size of the macerated pimento is less than 0.15 inch in a maximum dimension;

b. forming a dispersion of the macerated pimento, which is essentially calcium chloride in an aqueous medium having dissolved therein as the sole essential gelling agent from 1% to 10% by weight of alginic acid or a food-grade salt thereof, calculated as alginic acid per se where the alginic acid has at least 50 molar % of L-guluronic acid units, and the amount of macerated pimento in the dispersion is from 5% to 99% by weight of the dispersion;

c. shaping the dispersion, which is essentially ungelled, into a form suitable for stuffing a pitted olive and wherein the shaped dispersion has a thickness of no greater than 0.5 inches;

d. contacting the shaped dispersion with a setting solution of a food-grade compound having a water-soluble, divalent cation for a time period of at least 15 minutes, whereby the alginic acid is non-reversibly gelled throughout the shaped dispersion to a condition that is not reversible by either heat or alcohol and which forms shape-sustaining reconstituted pimento which is capable of being looped at least greater than 180° in a radius of less than 0.3 inch; and

e. inserting by means of an automatic olive stuffing machine at least a portion of the reconstituted pimento into a pitted olive.

26. A reconstituted pimento stuffed olive wherein the reconstituted pimento has a thickness of no greater than 0.5 inch comprising a shaped and gelled dispersion of 5% to 95% by weight of macerated natural pimento wherein the particle size of the macerated pimento is less than 0.15 inch, the gelling agent is from 1% to 10% by weight alginic acid or a food-grade salt thereof wherein the alginic acid has at least 50 molar % of L-guluronic acid units, and the gel is cross-linked throughout the shaped dispersion into a non-reversible gel with a food-grade divalent cation to a condition that is not reversible by heat or alcohol, the shape of the reconstituted pimento being in a form suitable for being inserted into a pitted olive and being capable of being looped at least 180° in a radius of less than 0.3 inch.

4,006,257
VACUUM TREATING FRUIT PIECES IN AQUEOUS SOLUTIONS CONSISTING OF SODIUM BISULFITE OR SODIUM SULFITE AND CITRIC ACID

Clarence H. Kolk, 242 New Ranch Park, Clearwater, Fla. 33515

Filed Aug. 7, 1975, Ser. No. 602,899
Int. Cl.² A21D 4/00
U.S. Cl. 426—269 5 Claims

1. A method of processing fruit, including cutting the fruit into pieces and soaking the pieces in an aqueous solution of citric acid and a member selected from the group consisting of sodium bisulfite and sodium sulfite, wherein the improvement comprises:

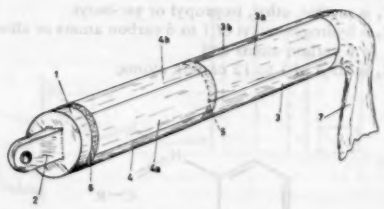
soaking said pieces under vacuum in an aqueous solution consisting of said member selected from the group consisting of sodium bisulfite and sodium sulfite in a concentration to produce said member selected from the group consisting of sodium bisulfite and sodium sulfite in the juice of said pieces in a range between 192 and 256 parts per million parts of the juice in said pieces by weight, and citric acid in a range between 3½ to 4½ milli-liters per 100 grams of the juice in said pieces including the citric acid that may be present in said fruit,

draining said pieces, and holding the same for use.

4,006,258
PROCESS FOR PRODUCING SAUSAGE CASINGS

Hubert J. Vaessen, Deventer, Netherlands, assignor to H. Vaessen B.V., Deventer, Netherlands

Filed Dec. 9, 1974, Ser. No. 531,099
Claims priority, application Netherlands, Dec. 12, 1973, 7317064
Int. Cl.² A23L 1/31; A22C 13/00
U.S. Cl. 426—272 8 Claims



1. A process for producing sausage casings of any desired length by joining together strips of intestine which have been rendered porous and sticking by a conventional pretreatment, with overlapping edges on a mandrel, having an upstream and a downstream end comprising

applying strips of intestine with overlapping edges about the circumference of the mandrel to stick the overlapping edges together;

partially drying the stuck product and decreasing its stickiness to the extent that the intestine material can be moved along the mandrel from the upstream end to the downstream end as a tube while maintaining at least the trailing end of the stuck product sticky;

moving the obtained product to the downstream end of the mandrel;

applying further strips of intestine with overlapping edges about the circumference of the mandrel and over the end of the stuck piece which is still sticky to stick the overlapping edges and ends together;

drying completely at least the overlapping ends stuck together and all undried portions preceding the overlapped

ends, the portion of the casing on the mandrel being dried to the extent that the casing can be moved as a tube to the downstream end of the mandrel, while maintaining at least the trailing end of the casing sticky;

moving the casing to the downstream end of the mandrel;

repeating the strip application and drying steps; and

after the desired length of casing has been obtained the still sticky part thereof is dried completely.

4,006,259

PRESERVATIVE COATING FOR FRUITS AND VEGETABLES

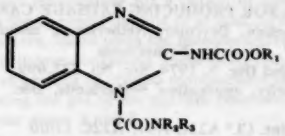
Arthur F. Kalmar, Riverside, Calif., assignor to FMC Corporation, Philadelphia, Pa.

Filed Apr. 1, 1975, Ser. No. 564,145

Int. Cl.² A23B 7/14

U.S. Cl. 426—308 **3 Claims**

1. A method of preserving fresh fruits and vegetables comprising coating them with a waxy protective adhering film formed by treating the fruits and vegetables with a volatile petroleum solvent solution having dissolved therein a waxy film forming material and an alkyl aryl sulfonic acid solution of a fungicidal benzimidazole selected from the class consisting of:



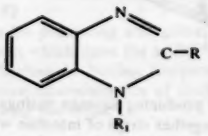
I.

wherein

R_1 is methyl, ethyl, isopropyl or sec-butyl;

R_2 is hydrogen, alkyl of 1 to 6 carbon atoms or alkenyl of 3 to 6 carbon atoms and

R_3 is alkyl of 1 to 12 carbon atoms;

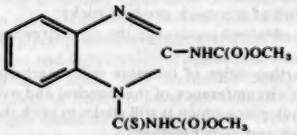


II.

wherein

R is a five-membered heterocyclic ring containing nitrogen and sulfur and

R_1 is hydrogen, lower alkyl of 1 to 5 carbon atoms or lower alkenyl of 3 to 6 carbon atoms and



III.

and allowing the solvent to evaporate.

4,006,260

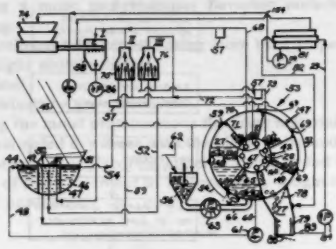
METHOD AND APPARATUS FOR EVAPORATION OF MOISTURE FROM FRUIT AND VEGETABLE PARTICLES

Wells A. Webb, Orovada, Nev., and William R. Webb, Berkeley, Calif., assignors to Wells A. Webb, Orovada, Nev.

Filed Jan. 29, 1975, Ser. No. 544,959

Int. Cl.² A23B 7/02; A23L 1/325

U.S. Cl. 426—438 **20 Claims**



1. A multi-stage process of at least two stages for dehydrating and puffing food particles, comprising the steps of:

selecting a charge of food particles, each particle of a size sufficient to contain a plurality of macropores;

introducing said charge of food particles into an encloseable chamber of a vessel and closing said chamber;

removing moisture from said particles by dehydration including;

in a first stage, applying heat to said particles by submerging said particles in a liquid medium having a low vapor pressure at ambient temperatures, raising the temperature of said medium to a first elevated temperature above ambient temperature

reducing the pressure on said particles to a first pressure below atmospheric pressure,

maintaining said first temperature and said first pressure for a first period of time sufficient to reduce the moisture content of said food particles to between 20% and 50%; and in a subsequent stage removing further moisture from said particles by a non-submerged step of dehydration including supporting said particles above the level of said medium in said chamber;

further increasing the temperature of said liquid medium to a non-submerged temperature above said first temperature by applying heat to said particles by contacting said particles with a continuous spray of said medium;

decreasing the pressure on said particles to a non-submerged pressure below said first pressure and

maintaining said non-submerged temperature and non-submerged pressure for a period of time sufficient to reduce the moisture content of said particles to a range of between 20% and about 2%, thereby forming said particles into a puffed condition having a plurality of macropores;

applying a cool medium at about ambient temperature to the particles while maintaining said non-submerged pressure thereon to harden the structure and preserve the macropores; and,

centrifuging said particles to remove residue of said liquid medium therefrom.

4,006,261

FLAVORING WITH MIXTURES OF THEOBROMINE AND CYCLIC DIPEPTIDES

Wilhelm Pickenhagen, Onex; Paul Dietrich, Chene-Bourg, both of Switzerland; Borivoj Keil, St. Remy les Chevreuse, and Edgar Lederer, Sceaux-Seine, both of France, assignors to Firmenich S.A., Geneva, Switzerland

Continuation of Ser. No. 508,726, Sept. 24, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,832

Claims priority, application Switzerland, Sept. 28, 1973, 13957/73

Int. Cl.² A23L *1/234*

U.S. Cl. 426—537 6 Claims

1. A flavoring composition capable of imparting and enhancing a bitter and astringest flavor to a foodstuff or beverage selected from the group consisting essentially of cocoa, a cocoa product or a cocoa imitating substitute which composition comprises, as an active ingredient, components A and B, said component A being a cyclic dipeptide or mixtures of two cyclic dipeptides and said component B being theobromine in the following weight ratios:

a. when component A is a single cyclic dipeptide, in the weight ratio of from 1.1:1 to 1:2;

b. when the component A is a mixture of two cyclic dipeptides, in the weight ratio of from about 1:1:1 to 1:3:5.

4,006,262

INSTANT PUDDING COMPOSITION AND PROCESS

Richard A. Smith, and Thomas E. Haney, both of Dover, Del., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,200

Int. Cl.² A23L *1/187*

U.S. Cl. 426—573 7 Claims

1. In a composition for use in preparing an instant pudding by interaction with milk protein of an alkali pyrophosphate and an alkali orthophosphate, and containing a stiffening agent and a sugar as a sweetening agent, the improvement which comprises maintaining the particle size range of said orthophosphate such that at least 90% thereof passes through a U.S. Screen No. 100 and the particle size of said sugar such that at least 85% thereof passes through a U.S. Screen No. 70.

4,006,263

IRON-FORTIFIED SOLUBLE COFFEE AND METHOD FOR PREPARING SAME

Sigmund L. Klug, Monroe; Frederick J. Patrizio, New City, and William J. Einstman, Port Chester, all of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 20, 1973, Ser. No. 333,838

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² A23F *1/04*

U.S. Cl. 426—594 6 Claims

1. A method for producing an iron-fortified soluble coffee comprising the steps of:

a. producing a liquid coffee extract from a counter-current, semi-continuous extraction process, said extract having a soluble coffee solids concentration of from about 10 to 30% by weight,

b. cooling said extract as it is leaving the extraction process to between about 35° and 70°F,

c. maintaining said extract at between 35 and 70°F for a period of time sufficient to effect precipitation of polyhydroxyphenols and polyhydroxy-phenol-polysaccharide complexes that are present in the coffee extract, then

d. separating said precipitated material from said extract,

e. adding a source of assimilable, elemental iron to the separated extract of step d at a level of from 0.01 to 1.0% elemental iron by weight of soluble coffee solids, and then

f. drying said iron-fortified extract.

4,006,264

PREPARATION OF CONFECTIONERS' FATS

Chester Martin Gooding, Westfield, N.J., assignor to CPC International Inc., Englewood Cliffs, N.J.

Continuation of Ser. No. 411,523, Oct. 31, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,053

Int. Cl.² A23D *5/00*

U.S. Cl. 426—607 3 Claims

1. A process for preparing a liquid fraction confectioners' fat comprising:

randomizing by interesterification a mixture of a hydrogenated lauric fat and a hydrogenated non-lauric fat portion, said lauric fat portion containing fatty acids having predominantly 6, 8, 10, 16 and 18 carbon atoms, the non-lauric fat portion containing at least 30% palmitic acid said mixture having an iodine value of less than about 3.0,

crystallizing the randomized mixture of fats at a temperature between about 90° F. and 110° F. for a period of time sufficient to obtain a solid filter cake fraction and a liquid filtrate fraction wherein the liquid fraction contains more lauric acid and less stearic acid than is contained in the uncrystallized, randomized mixture, said stearic acid content being reduced by about 7.7%–24% and said lauric acid content being increased by about 4.9%–10.3%; and,

recovering the liquid fraction.

4,006,265

PROCESS FOR DETOXIFYING CROPS, PARTICULARLY CORN, INFECTED BY FUSARIUM

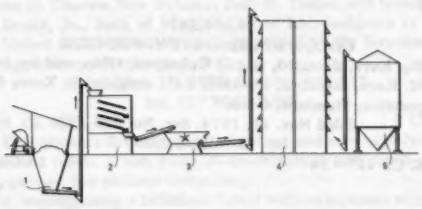
Károly Tamás, Kalocsa, and László Wöller, Budapest, both of Hungary, assignors to Mezogazdasagi Foiskola, Kaposvar, Hungary

Filed Apr. 9, 1974, Ser. No. 459,377

Claims priority, application Hungary, Apr. 26, 1973, ME 1622

Int. Cl.² A01N *11/00, 17/00, 23/00*

U.S. Cl. 426—623 2 Claims



1. A process for detoxifying corn used for animal feeding, said corn being infected by Fusarium, comprising the steps of steeping the corn with a member selected from the group consisting of a 3 to 6% aqueous solution of hydrogen peroxide and a 6% aqueous solution of ammonium hydroxide, and then heat drying the corn.

4,006,266

PROCESS FOR MAKING A DRY PET FOOD HAVING A HARD COMPONENT AND A SOFT COMPONENT

David Palmer Bone, Palatine, and Edward Leo Shannon, Barrington, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 8, 1975, Ser. No. 620,720

Int. Cl.² A23L *1/16*

U.S. Cl. 426—623 9 Claims

1. A process for the production of a dry pet food capable of surviving long periods of storage, and having a water activity of 0.60 to 0.75 and a component first particle that is hard in texture and substantially amylaceous admixed with a compo-

nent second particle that is soft and meat-like in texture and appearance, comprising the steps of:

A. blending a first mixture comprising an amylaceous ingredient, an animal protein source, a vegetable protein source, fat, and sufficient water for processing, wherein said amylaceous ingredient comprises from about 20 to about 60 percent by weight; said vegetable protein source comprises 10–30 percent by weight, said fat comprises about 5–15 percent by weight; and said animal protein source comprises 5–25 percent by weight;

B. cooking while baking or extruding a mass of said first mixture at a temperature and time sufficient to gelatinize the said amylaceous ingredients;

C. forming particles of said first mixture;

D. cooling the cooked said first mixture to form the hard first particle having a moisture content of 8–12 percent by weight of the first particle;

E. blending a second mixture comprising a natural or modified proteinaceous adhesive, a plasticizing/humectant agent, and sufficient water for processing, wherein said proteinaceous adhesive is present in an amount from about 4–60 percent by weight and said plasticizing-/humectant agent is present in an amount from about 5–20 percent by weight;

F. cooking while extruding a mass of said second mixture to a temperature from about 215° to about 280° F.;

G. forming particles of said second mixture;

H. cooling the particles to form the soft second particle having a moisture content of 10–14 percent; and

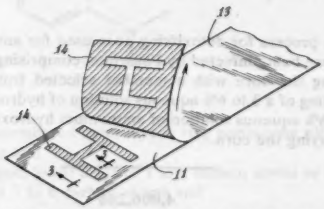
I. admixing about 10 percent to about 90 percent be weight of the hard first particles with about 10 percent to about 90 percent by weight of the soft second particle.

4,006,267

COLOR HIGHLIGHTING PROCESS

Philip Kurz, deceased, late of Columbus, Ohio, and by Jessie M. Kurz, executrix, Rockhill, S.C., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 19, 1974, Ser. No. 525,233
Int. Cl.² G03G *13/00*
U.S. Cl. 427—14 **10 Claims**



1. A method of color highlighting an image portion of a xerographic copy comprising:

a. applying a colored transfer donor including a substrate and a layer of colorant in a nonthermoplastic resin binder in face-to-face contact with an image portion of a xerographic copy;

b. thermally activating the xerographic image by causing it to be heated for 5 to 60 seconds within a temperature range of from about 130° to 250° F; and

c. removing the transfer donor to transfer the color of the donor layer to the image portion of the xerographic copy.

4,006,268

VAPOR COLLIMATION IN VACUUM DEPOSITION OF COATINGS

Kurt D. Kennedy, Berkeley; E. Darrell Erikson, Castro Valley, and Glen R. Scheuermann, Oakland, all of Calif., assignors to Airco, Inc., Montvale, N.J.

Filed Mar. 17, 1975, Ser. No. 558,997
Int. Cl.² C23C *13/02, 13/04*
U.S. Cl. 427—42 **10 Claims**

1. A method of coating a substrate by physical vapor deposition comprising:

placing a substrate and a vapor source having an area greater than **0.001** m^2 in a chamber;

providing particle flux of the vapor source greater than **0.25** $mole/s \cdot m^2$;

collimating the vapor by providing a gas in the chamber at a pressure greater than **5** mT and less than **100** mT; and

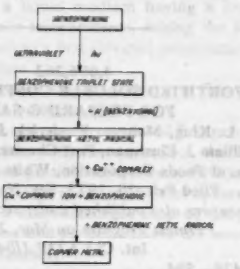
positioning the substrate to intercept a portion of the collimated vapor which is directed outward from the vapor source.

4,006,269

PHOTODEPOSITION OF METALS ON A NON-CONDUCTIVE SUBSTRATE

Derek G. E. Kerfoot, Pierrefonds, Canada, assignor to Canada Wire and Cable Limited, Canada

Filed Nov. 29, 1974, Ser. No. 528,210
Claims priority, application Canada, Dec. 3, 1973, 187208
Int. Cl.² B05D *3/06, 5/12*
U.S. Cl. 427—54 **92 Claims**



1. A method of plating a substrate of non-conductive material with a conductive film of predetermined metals comprising the steps of:

a. applying to said substrate a sensitizing solution containing a sensitizer, a hydrogen donor and a solvent, said sensitizer being capable, upon photochemical activation, of abstracting a hydrogen atom from said hydrogen donor in the presence of said solvent thereby becoming a ketyl radical;

b. subsequently immersing said substrate in a plating solution containing predetermined metal ions; and

c. irradiating said substance after treatment by said sensitizing solution and while said substrate is immersed in said plating solution with an ultraviolet source emitting radiations in the spectral range of 200 to 400 $m\mu$ to generate said ketyl radical for reducing the metal ions to metal.

4,006,270

SOLID CURABLE POLYENE COMPOSITIONS AND METHOD OF COATING THEREWITH

Charles R. Morgan, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 330,818, Feb. 8, 1973, Pat. No. 3,925,320, which is a continuation-in-part of Ser. No. 250,554, May 5, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,718

Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 18 Claims

1. A process which comprises:

A. applying to the surface of a substrate a solid layer of a curable composition consisting essentially of

1. A solid polyene which is a reaction product of a styrene-allyl alcohol copolymer and a member selected from the group consisting of at least one reactive unsaturated monoisocyanate and at least one reactive unsaturated monocarboxylic acid, said polyene containing at least 2 reactive carbon to carbon bonds per molecule; and

2. a liquid polythiol containing at least 2 thiol groups per molecule, the total combined functionality of (a) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (b) the thiol groups per molecule in the polythiol being greater than 4;

B. exposing selcted areas of said composition to a free radical generator, thereby curing the exposed areas of said composition;

C. removing the unexposed uncured areas of the curable composition, thereby baring the surface of said substrate beneath the removed uncured areas of the composition.

4,006,271

ABRASION RESISTANT COATING FOR POLYCARBONATE SUBSTRATES

Hollis E. French, N. Chelmsford, Mass., and Juergen M. Kruse, Rockville, Md., assignors to Itek Corporation, Lexington, Mass.

Filed Jan. 28, 1976, Ser. No. 653,179

Int. Cl.² B32B *27/28*; G02C *7/02*

U.S. Cl. 427—164 10 Claims

1. A process for forming an abrasion resistant, adherent coating on a polycarbonate substrate, comprising:

a. forming a coating solution containing from about 25 to about 75% by weight of a hydrolyzed C_1–C_3 alkyltri(lower alkoxy)silane in a water-miscible, volatile, organic solvent, said solution also containing from about 0.1 to about 20% by weight of an abrasion-resistance enhancer and at least about 0.05 parts of a stabilizing weak acid per part of enhancer;

b. applying a thin, uniform coating of said coating solution to a clean surface of the polycarbonate substrate; and,

c. dehydrating said coated component at an elevated temperature until an abrasion resistant, adherent coating is formed.

4,006,272

PROCESS FOR PREPARATION OF GLASS FIBER MATS

Kahei Sakaguchi; Masaaki Minakata; Kazutaka Yamashita, and Fumiko Sugimoto, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Feb. 14, 1975, Ser. No. 549,917

Claims priority, application Japan, Feb. 28, 1974, 49-23922

Int. Cl.² B32B *17/04*, *27/28*

U.S. Cl. 428—268 12 Claims

9. A resin-bonded glass fiber mat having a rapid rate of dissolution in vinyl monomers, which consists essentially of:

a glass fiber mat having adhered thereto and substantially uniformly distributed thereon from 2.5 to 10 percent by weight, based on the weight of the glass fibers, of a binder resin consisting of

A. from 25 to 100 percent by weight of polystyrene or a copolymer of styrene and at least one comonomer copolymerizable with styrene selected from the group consisting of α-methylstyrene, acrylonitrile, methyl methacrylate, ethyl acrylate, vinyl toluene and butadiene, said copolymer containing at least 50 mole % of styrene units, said component A having a melting point of 100° to 150° C and having a number average molecular weight of 2500 to 7000, and

B. the balance of zero to 75 percent by weight of said binder resin is an unsaturated polyester resin having a melting point of 80° to 130° C.

4,006,273

WASHABLE AND DRY-CLEANABLE RAISED PRINTING ON FABRICS

Leon E. Wolinski, Checktowaga; Arthur R. Endress, Hamburg, and David W. Teloh, Depew, all of N.Y., assignors to Pratt & Lambert, Inc., Buffalo, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,669

Int. Cl.² B05D *5/00*, *3/02*

U.S. Cl. 427—278 10 Claims

1. The method of forming a washable and dry-cleanable foamed print on a washable and dry-cleanable fabric substrate comprising selectively applying to said substrate a printing composition comprising an adherent film forming cross-linkable polymer binder in a liquid vehicle therefore, said composition containing about 1.0 to 45 weight percent, based on the weight of said binder, of thermoplastic, thermally expandable microspheres about 0.5 to about 300 microns in diameter; drying to remove said liquid vehicle to form a dispersion of said microspheres in said binder; heating to expand said microspheres and cross-link said polymer binder to form a raised and textured surface; and curing the cross-linked polymer binder at a temperature of about 300° F for a period of about 1 to 3 minutes.

4,006,274

2,4,6-TRIS(CARBAMOYLMETHYLAMINO)-1,3,5,-S-TRIAZINE

Leon H. Chance, New Orleans; Judy D. Timpa, and George L. Drake, Jr., both of Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 19, 1975, Ser. No. 615,015

Int. Cl.² B05D *3/02*

U.S. Cl. 427—381 1 Claim

1. A process for imparting to cotton and cotton-polyester blended fabric a soft hand in combination with wash-wear properties, the process comprising:

a. impregnating a cellulosic fabric with an aqueous solution containing about 10% of trimethylol derivative of 2,4,6-Tris (cabamolymethylamino)-1,3,5-s-triazine and about from 0.5% to 1.0% of a catalyst selected from the group consisting of:

$Zn(NO_3)_2 \cdot 6H_2O$,

$MgCl_2 \cdot 6H_2O$, and a

1:1 mole ratio of citric acid and $MgCl_2 \cdot 6H_2O$,

b. dying the wet impregnated fabric at about 60° to 85° C for 3–7 minutes, and

c. curing at about 150° for 3–5 minutes.

4,006,275

MATERIAL FOR, AND METHOD OF FORMING, TUBULAR WALLS FOR PRODUCT CONTAINERS

Victor Monia, San Jose, Calif., assignor to Guardian Packaging Corporation, Newark, Calif.

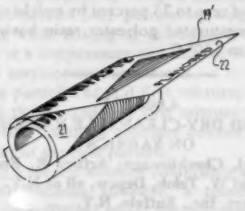
Division of Ser. No. 290,781, Sept. 21, 1972, Pat. No. 3,859,154. This application Sept. 25, 1974, Ser. No. 509,013

Int. Cl.² B65D *35/00*

U.S. Cl. 428—36 3 Claims

1. A unitary tubular wall for a product dispensing tube

comprising a section of a product packaging sheet material; a plurality of different complete messages on one side surface of said section respectively in succeeding portions serially arranged along one dimension of said section, the differences between said messages relating to different information it is desired to be in a position to convey on separate product dispensing tubes and each of said succeeding portions generally being of essentially identical length as measured along



said one dimension and each equal to the outer circumference of said tubular wall, said section being convolute along said dimension for a number of layers equal to the number of said different messages and with only one of said different messages on the exposed side of the exterior layer, and interior adjacent layers with the remaining ones of said different messages being permanently bonded to one another to form the unitary tubular wall.

4,006,276

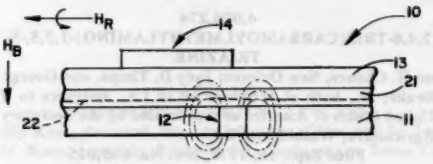
MAGNETIC BUBBLE DOMAIN FIELD SHUNT

Peter K. George, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 425,058, Dec. 14, 1973, abandoned. This application May 12, 1975, Ser. No. 576,526

Int. Cl.² G11C *11/14, 19/00*

U.S. Cl. 428—195 **6 Claims**



1. A bubble domain composite suitable for propagating magnetic bubble domains therein, comprising:

a first layer comprising bubble domain material having a high magnetization characteristic for establishing relatively small magnetic bubble domains therein in the presence of a magnetic field which is substantially normal thereto;

a second layer comprising patterned, high magnetic permeability material supported by said first layer for selectively propagating magnetic bubble domains in said first layer in response to the application of a cyclically varying magnetic field substantially parallel to said first and second layers, said second layer of material subject to a polarizing effect therein due to the magnetic field produced by said magnetic bubble domains;

a bubble domain field shunt layer comprising a layer of high magnetic permeability material such as permalloy interposed between said first and second layers to decrease the polarizing effect in said second layer caused by the magnetic field produced by magnetic bubble domains in said first layer and thereby decrease the in-plane field necessary to couple magnetic bubble domains to portions of said second layer;

said shunt layer having a substantially uniform thickness of approximately 500–1000A and extending over a significant portion of the active area of said first layer; and

a layer of electrically insulating material interposed between said second layer and said shunt layer.

4,006,277

RANDOM LENGTH CUTTER

William F. Laird, Kingston, Canada, assignor to Hartford Fibres Ltd., Kingston, Canada

Division of Ser. No. 472,073, May 21, 1974, Pat. No. 3,915,042. This application May 20, 1975, Ser. No. 579,137

Int. Cl.² D03D *3/00*

U.S. Cl. 428—224 **10 Claims**

1. Uniformly mixed cut staple fibers having lengths which vary substantially infinitely between predetermined maximum and minimum cut lengths wherein the number of fibers of any given length is substantially equal to the number of fibers of any other given length.

4,006,278

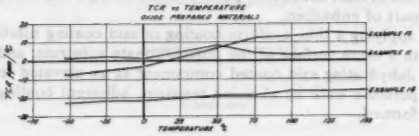
LOW TEMPERATURE COEFFICIENT OF RESISTIVITY CERMET RESISTORS

Clifford Joseph Pukaite, Mequon, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

Division of Ser. No. 359,244, May 11, 1973, Pat. No. 3,899,449. This application Apr. 7, 1975, Ser. No. 565,870

Int. Cl.² H01C *17/06;* H01B *1/08;* B32B *17/00*

U.S. Cl. 428—427 **3 Claims**



1. A cermet resistor comprising: a substrate composed of a ceramic insulating material, a conductive phase and a glass phase interdispersed and fused to said substrate, said conductive phase composed of vanadium oxide in the range from about 1.00 to about 10.00 weight percent and ruthenium dioxide in the range of from about 1.00 to about 30.00 weight percent, and said interdispersed glass phase present in the range of about 50.00 to about 98.00 weight percent, said glass phase composed of lead oxide in the range of about 35.00 to about 45.00 weight percent, boron trioxide in the range of about 15.00 to about 25.00 weight percent and silicon dioxide present in the range of about 30.00 to about 40.00 weight percent.

4,006,279

OXIDATION ENHANCING-VITREOUS ENAMEL COATING ON METAL SUBSTRATE AND COMPOSITION THEREFOR

Ian George Robinson, Noble Park, Australia, assignor to Blythe Colours (Australia) Proprietary Ltd., East Brighton, Australia

Continuation of Ser. No. 420,187, Nov. 29, 1973, abandoned. This application June 13, 1975, Ser. No. 586,825

Int. Cl.[2] B32B *17/06;* C03C *5/02*

U.S. Cl. 428—432 10 Claims

6. The combination of a vitreous enamel coating adhered to a metal substrate, said coating being capable of enhancing oxidation of organic soils deposited thereon in the range of 300° to 550° F comprising a sintered comminuted mixture of previously smelted and quenched frit-producing material and a separate oxidation inducing agent in the form of a titanate bearing ore containing an oxide of a metal selected from the group consisting of nickel, cobalt, manganese, copper, chromium, iron and aluminum, in which the proportion of oxidation inducing agent to frit in the sintered comminuted mixture is in the range of 95:5 to 60:40 parts by weight.

4,006,280

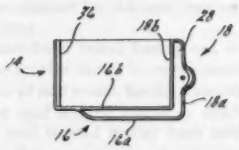
BATTERY HEAT SHIELD AND WINDSHIELD WASHER RESERVOIR

Paul La Verne Walker, Royal Oak, and Carmon Rue Strobel, Washington, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed July 11, 1975, Ser. No. 594,995

Int. Cl.[2] H01M *2/02;* B65D *1/24*

U.S. Cl. 429—98 7 Claims



1. A combination storage battery heat shield and windshield washer reservoir device comprising a boxlike structure having a generally planar cover for overlying the top of said battery, said cover being provided with openings to facilitate battery servicing, and a plurality of interconnected wall members extending generally at right angles to said cover for overlying the sides of said battery, and at least one of said wall members forming at least a portion of a chamber for storing a windshield washing fluid.

4,006,281

ELECTRIC CELLS

Trevor Leslie Markin, Goring-on-Thames, and Anthony Richard Junkison, Didcot, both of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of The United Kingdom of Great Britain and Northern Ireland, England

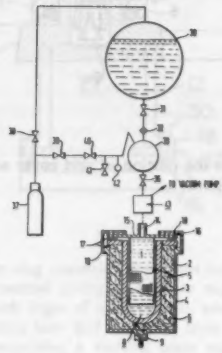
Filed June 30, 1975, Ser. No. 591,321

Claims priority, application United Kingdom, July 5, 1974, 30015/74

Int. Cl.[2] H01M *43/00*

U.S. Cl. 429—103 18 Claims

1. A method of filling an electric cell which comprises a compartment for receiving a liquid electrode, an electrolyte, and a constraining means in the compartment for constraining the liquid electrode to wet a surface of the electrolyte, the method comprising the steps of introducing into the compartment liquid electrode material, contacting the constraining means with the liquid electrode material, and subjecting the liquid electrode material to a pressure sufficient to force the liquid electrode material to penetrate the constraining means and thereby wet the electrolyte.



13. An electric cell comprising a compartment containing an electrode which, during use of the cell, is a liquid, an electrolyte in contact with the electrode, and a constraining means for constraining the electrode, when the electrode is in the liquid state thereof, to wet the electrolyte, said compartment further containing a gas at a pressure sufficient to ensure that the electrode, when the electrode is in the liquid state thereof, penetrates the constraining means and thus contacts the electrolyte and remains in the constraining means irrespective of any capillary action of the constraining means.

4,006,282

SEAL ARRANGEMENT FOR A LEAD TERMINAL WITH THE COVER OF A STORAGE CELL

Sipic Antoine, St. Jean de Braye, France, assignor to Saft-Societe des Accumulateurs Fixes et de Traction, Romainville and Compagnie Europeenne d'Accumulateurs, Paris, both of, France

Filed Dec. 15, 1975, Ser. No. 640,550

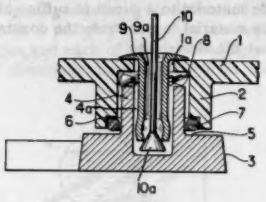
Claims priority, application France, Oct. 22, 1975, 75.32300

Int. Cl.[2] H01M *2/06*

U.S. Cl. 429—181 12 Claims

1. Seal in the cover of a lead-acid storage cell comprising a terminal post of malleable metal having a shoulder on the portion of said post situated inside the storage cell and a blind hole in said terminal post opening toward the outside, an expanded headed part whose head bears on the cover, a flexible gasket situated between a portion of the cover and the shoulder of the terminal post, said expanded part acting to expand a portion of said post and also resulting in compression of the flexible gasket between the shoulder and the cover

without, however, having the resultant expansion of the terminal post under the action of the said expanded part cause



contact between the portion of said cover and the expanded portion of said post.

4,006,283

PREPARATION OF DI-TERTIARY BUTYL PEROXIDE CROSSLINK POLYOLEFIN MATERIALS

Burton Thornley MacKenzie, Jr., Monroe; Maurice Prober, Fairfield, and Edward Vincent Wilkus, Trumbull, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,196

Int. Cl.[2] C08J *3/24*; C08K *5/14*

U.S. Cl. 526—57 **25 Claims**

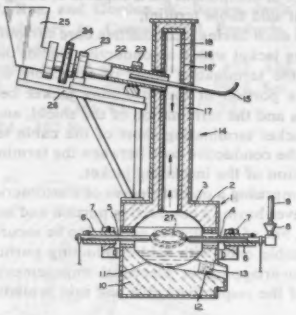
1. A method of effectively and rapidly dispersing and admixing liquid di-tertiary butyl peroxide with a peroxide crosslink curable polymeric polyolefin, comprising the steps of depositing a mass of particulate polyolefin material within a chamber, introducing a quantity of liquid di-tertiary butyl peroxide into the particulate polyolefin material a substantial depth below the surface of its mass, and admixing the particulate polyolefin material containing the introduced di-tertiary butyl peroxide therein to disperse the peroxide over the particles and within the mass of the polyolefin.

4,006,284

EXTENDED ARC FURNACE AND PROCESS FOR MELTING PARTICULATE CHARGE THEREIN

Robert Sidney Segsworth, Toronto, and Charles Benjamin Alcock, Don Mills, both of Canada, assignors to Tibur Metals, Ltd., Toronto, Canada

Filed June 2, 1975, Ser. No. 580,839
Claims priority, application Canada, Apr. 16, 1975, 224734
Int. Cl.² H05B *11/00*
U.S. Cl. 13—9 R 20 Claims



1. A furnace adapted for the heat treatment of particulate matter comprising

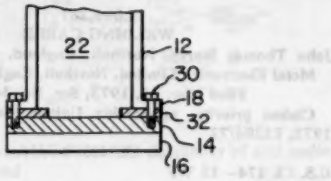
1. a refractory-lined vessel having one or more openings adapted to receive one or more electrodes extending into the interior of said vessel, having a hearth therein adapted to receive said treated matter, a discharge means for removing said treated matter from said hearth, and an opening in the upper region of said vessel;
2. a reaction chamber rising from said vessel having a passageway through the length thereof, said reaction chamber having an upper portion and inlet means in said upper portion for transmitting the particulate matter to be heat treated into said passageway, said passageway communicating with the opening in the upper region of said vessel, both for receiving gases heated by electrodes in said vessel and rising into said passageway, to direct said gases and said particulate matter into a counter-current heat exchange relationship, and for feeding the heated particulate matter through said upper region opening in said vessel;
3. one or more electrodes, at least one of which has an axial opening extending through at least a major portion of the length of said electrode and communicating with the interior of said vessel, said axial opening having a size predetermined to create a stabilized extended arc according to the flow rate and linear velocity of gas flowing through said opening;
4. a means for supplying the selected gas to the axial opening in said electrode or electrodes whereby to feed said gas into the interior of said vessel; and
5. a power supply connected to said electrode adapted to supply sufficient power to produce an extended arc between said electrode and one or more other electrodes or between said electrode and a charge in the hearth of said vessel wherefore the rate of gas flow and linear velocity of the gas stabilizes the said extended arc.

4,006,285

STARTER PLATE FOR ELECTRO SLAG REMELTING APPARATUS

Robert J. Steinman, Jr., Pittsburgh; John M. Pruss, Carnegie, and Leonard G. Joseph, Pittsburgh, all of Pa., assignors to Cyclops Corporation, Pittsburgh, Pa.

Filed Jan. 12, 1976, Ser. No. 648,041
Int. Cl.² H05B *3/60*
U.S. Cl. 13—9 ES 10 Claims



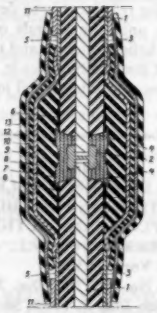
1. In an electro slag remelting apparatus including an ingot mold having a central cavity, a base to support a bottom surface of a remelt ingot of a first metal, and a consumable electrode extending into said cavity to form said ingot, the improvement comprising a starting plate means positioned between the base and the ingot, said starting plate means having a central opening therethrough and extending inward from the ingot mold a short distance into the cavity so as to contact at least a portion of the bottom surface in the area adjacent the perimeter thereof.

4,006,286

HIGH-VOLTAGE CABLE JOINT WITH CONDUCTIVE MEANS TO DECREASE ELECTRIC FIELD INTENSITY THEREIN

Erik Georg Larsson, Spanga, Sweden, assignor to Kabeldon AB, Arlingsas, Sweden

Filed Dec. 19, 1975, Ser. No. 642,292
Claims priority, application Sweden, Jan. 24, 1975, 7500774
Int. Cl.² H02G *15/08*
U.S. Cl. 174—73 R 2 Claims



1. Improvement in a high-voltage cable joint for electrically connecting conductors of a cable, each conductor having a surrounding layer of solid insulation, and a conducting screen surrounding at least a portion of said conductor, said cable joint having a jointing sleeve connecting bared ends of said conductors, wherein the improvement comprises: a coating surrounding at least a portion of said solid insulation of each of said conductors, said at least a portion of said solid insulation beginning at the end of said solid insulation near said jointing sleeve, said end of said solid insulation having an end

surface lying substantially perpendicular to the axis of said cable and said jointing sleeve, said coating having a resistivity lower than that of said solid insulation and which is voltage dependent; and a conducting material positioned about said jointing sleeve between the end surfaces of said solid insulating layers and in electrical communication with said coating on each solid insulation, said conducting material having a diameter approximately equal to the diameter of said solid insulation, whereby the electric field intensity is decreased.

4,006,287

WELDING CABLE

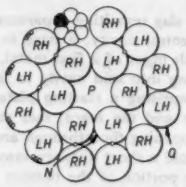
John Thomas Storey, Northolt, England, assignor to Delta Metal Electronics Limited, Northolt, England

Filed Mar. 15, 1973, Ser. No. 341,591

Claims priority, application United Kingdom, Mar. 16, 1972, 12284/72

Int. Cl.² H01B 7/34

U.S. Cl. 174—15 WF **11 Claims**



1. An electrical cable rope comprising eighteen electrical conductor units with six of the conductor units wound together in a helical manner to form a core with the conductors arranged in side-by-side contacting relationship, a hollow central passage being directed through the core, each conductor unit being twisted in the opposite direction to the two conductor units in contact therewith, the other twelve conductor units being wound together in a helical manner in side-by-side contacting relationship to surround said core, each of the outer conductor units being twisted in the opposite direction to the two outer conductor units in contact therewith and with each conductor unit comprising an even number of bunches of strands of electrically conductive material, said number of bunches being at least four and being arranged in side-by-side contacting relationship to define a hollow central passage through the unit, the strands of each bunch being wound together in a helical manner and in the opposite direction to the strands of the two bunches in contact therewith so that zero electrical wear points prevail in the cross-section of the unit.

4,006,288

HIGH VOLTAGE SHIELDED CABLE TERMINATION, SPLICE CONNECTION, AND METHOD OF MAKING A SPLICE CONNECTION

David R. Stevens, Hackettstown, N.J., assignor to Amerace Corporation, New York, N.Y.

Continuation of Ser. No. 537,703, Dec. 30, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 637,988

Int. Cl.² H02G 15/02, 15/08, 1/14

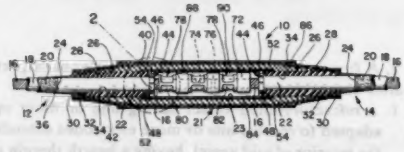
U.S. Cl. 174—73 R **9 Claims**

5. A termination of a high voltage cable having a conductive core surrounded by an insulating jacket within a conductive shield, wherein a portion of said conductive shield is removed to expose a portion of said insulating jacket and a portion of said insulating jacket is removed to expose a portion of said conductive core, comprising: a housing, an adaptor sleeve, and retaining means, said housing including a portion overlying the exposed portion of said conductive core and an insulating portion and a conducting portion, said adaptor sleeve having an insulating portion disposed in engagement with said housing insulating portion and said cable insulating jacket and having a conducting portion forming an electrical path between the conducting portion of said housing and said conductive cable shield, and said retaining means comprising an annular-shaped member directly affixed onto said conductive core and engaging said portion of said housing overlying said conductive core, said retaining means being disposed in mutual abutting relationship with the terminal end face of said cable insulating jacket and the terminal end face of said adaptor sleeve for precluding axial movement of said adaptor sleeve toward the terminus of said conductive core, said retaining means being adapted to provide a thermally conductive path between said conductive core and said housing.

9. The method of making electrical connection between termini of a pair of high voltage shielded electrical cables, with the aid of a kit of component parts capable of being assembled in the field of said cable termini,

said cables each having a conductive core surrounded by an insulating jacket within a conductive shield, the shield of each cable terminating short of the cable terminus to expose a portion of the insulating jacket between the terminus and the termination of the shield, and the insulating jacket terminating short of the cable terminus to expose the conductive core between the terminus and the termination of the insulating jacket,

said kit comprising a pair of sleeves of elastomeric material, said sleeves having a conducting portion and an insulating portion, one of said sleeves adapted to be secured on each of the cable ends with said conducting portion of each sleeve overlapping in electrical engagement with the shield of the respective cable and said insulating portion



of each sleeve in engagement with the insulating jacket of the respective cable; connector means for joining the ends of said conductive cores together; a housing, said housing having an insulating portion and a conducting portion, said housing being adapted to overlie said sleeves and said connector means with said conducting portion forming a conductive path bridging said conducting portions of said pair of sleeves, said housing insulating portion being in engagement with said insulating portion of each of said pair of sleeves, and said housing defining a chamber surrounding the connector means; and a pair of retaining means for precluding axial movement of said sleeves towards the cable termini and for providing a thermally conductive path extending between each of said conductive cores and said housing, each of said retaining means being adapted to be affixed directly onto one of said conductive cores in axially engaging relation with both said one of said sleeves and its corresponding insulating jacket,

said method comprising the following steps:

a. positioning said housing on one of said cables in displaced relation with respect to that cable's corresponding terminus;

b. securing each one of said pair of sleeves on a respective cable end with said conductive portion of each sleeve overlapping in electrical engagement the shield of the respective cable and said insulating portion of said sleeve in engagement with the insulating jacket of the respective cable and with the terminal end face of each said sleeve in substantial alignment with the terminal end face of the insulating jacket on each said cable end respectively;

c. affixing each one of said pair of retaining means directly

onto a respective one of said conductive cores in axially engaging relation with both the terminal end face of a corresponding sleeve and the terminal end face of a corresponding insulating jacket of a corresponding cable;

d. joining the ends of said conductive cores together with said connector means; and

e. displacing said housing in the direction of said connector means so as to slidably reposition said housing over said pair of sleeves, said pair of retaining means, and said connector means, and with the conductive portion of said housing forming a conductive bridge between the conductive portions on said pair of sleeves.

4,006,289

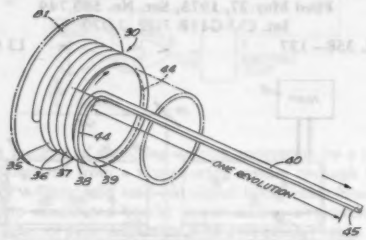
ELECTROMECHANICAL CABLE DEPLOYABLE IN A NO-TORQUE CONDITION, AND METHOD

Norman P. Roe, and Gordon W. Brown, both of Idyllwild, Calif., assignors to Consolidated Products Corporation, Idyllwild, Calif.

Continuation-in-part of Ser. No. 497,872, Aug. 16, 1974, abandoned. This application Nov. 18, 1974, Ser. No. 524,665

Int. Cl.² H01B *17/22*

U.S. Cl. 174—102 R **36 Claims**



1. A coiled electromechanical cable adapted for deployment in an untwisted state along a generally straight path and when thus deployed to be substantially free of twisting movements resulting from changes in the longitudinal tensile load upon the cable, the cable including a conducting core, a plurality of fibrous armoring elements arranged circumferentially around the core, and a sheath of protective material encompassing the armoring elements; the cable being arranged such that when it lies straight and untwisted said fibrous armoring elements extend generally parallel to one another and to the longitudinal axis of the cable and are circumferentially spaced apart a sufficient distance to permit the cable to be twisted when it is rolled; the cable being coiled into a roll with approximately 360° of twist in the cable within each complete loop of the roll.

4,006,290

SURFACE WAVE FREQUENCY SELECTIVE DEVICE

Richard A. Momberger, Onondaga, and G. Norman Williams, Seneca, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Aug. 12, 1974, Ser. No. 496,754

Int. Cl.² H04N *5/60*

U.S. Cl. 358—196 **9 Claims**

1. An intermediate frequency circuit for a television receiver comprising:

means for providing an intermediate frequency signal including an audio frequency component and a video frequency component;

a surface wave frequency selective device including a substrate of piezoelectric material, a first comb of electrodes disposed on said substrate and connected to said means for providing an intermediate frequency signal, and a second comb of electrodes disposed on said substrate and interleaved with said first comb to form a single interdigital transducer on said substrate for attenuating said audio frequency component by a predetermined amount relation to said video frequency component for providing a step in the frequency response characteristic of said inter-

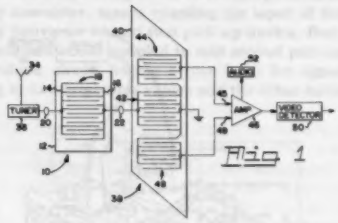


Fig. 1

mediate frequency circuit at the frequency of said audio component; and

means connected to said second comb for receiving said intermediate frequency signal therefrom.

4,006,291

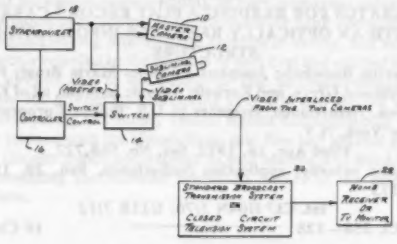
THREE DIMENSIONAL TELEVISION SYSTEM

Donald J. Imsand, 12 Walnut Ave., Shalimar, Fla. 32579

Filed Feb. 22, 1974, Ser. No. 445,002

Int. Cl.² H04N *9/56*

U.S. Cl. 358—92 **6 Claims**



1. A method of displaying by projecting a stereo pair of images to present a single three dimensional image to normal human perception comprising the steps of positioning a pair of video cameras in stereo relation to each other to view a scene, switching the video signal from first one camera and then the other camera, controlling the time interval that each of the cameras is operative so that one camera is active nearly all of the time while the other camera is active only briefly, synchronizing the video of the two cameras and switched video signals, and transmitting and displaying the switched video signals on a conventional television receiver thereby allowing the human visual perception process to interpret the switched signals as a single three dimensional image.

4,006,292

INFORMATION RECORDING AND REPRODUCING SYSTEM WITH PLURAL INFORMATION TRACKS WITHIN A SINGLE GROOVE

Louis F. Schaefer, Palo Alto, Calif., assignor to Sharp Corporation, Osaka, Japan

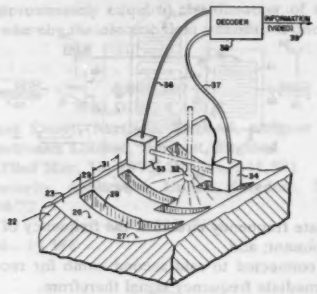
Filed Sept. 3, 1974, Ser. No. 502,559

Int. Cl.² H04N *5/76*; G11B *11/00*

U.S. Cl. 358—128 **2 Claims**

1. An information recording and reproducing system having a high information rate comprising a disc storage medium having a recording groove and associated transducer means, the combination comprising: a pair of recording tracks formed

in said recording groove, means for receiving the information to be recorded, processing and encoding the information and recording portions thereof in each of said tracks as a plurality of pits disposed along said tracks with the spacing and size of said pits modulated in accordance with the input information, each of said tracks having a predetermined maximum information rate capacity which is less than the high information rate, transducer means adapted to simultaneously scan each of said tracks and each providing output signals corresponding to the information on said tracks, and means for decoding the output of said transducer means and providing information at the original high information rate.



4,006,293

APPARATUS FOR READING A FLAT RECORD CARRIER WITH AN OPTICALLY READABLE INFORMATION STRUCTURE

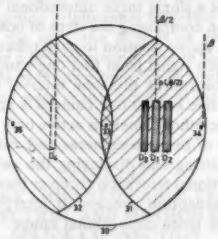
Gijsbertus Bouwhuis; Josephus Johannes Maria Braat; Peter Ferdinand Greve, and Kornelis Antonie Immink, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,727

Claims priority, application Netherlands, Feb. 28, 1975, 7502373

Int. Cl.² H04N 5/76; G11B 7/12

U.S. Cl. 358—128 **10 Claims**



1. An apparatus for reading a flat record carrier on which information, for example video and/or audio information, is stored in an optically readable track-shaped information structure, which apparatus comprises a radiation source, an objective system means for supplying radiation from the radiation source via the record carrier to radiation-sensitive information detection means for converting the read beam which is supplied by the radiation source and modulated by the information structure into an electric signal, and which apparatus further comprises a focussing detection means for providing a signal corresponding to the distance between the focal point of said read beam and the track-shaped structure measured along said read beam, and a centering detection means providing a signal corresponding to the eccentricity between the center of the read beam and the center of a track on which said read beam is directed, said focussing detection means and centering detection means being connected to electronic circuits for deriving control signals for correcting the focussing of the objective system and respectively the centering of the read beam relative to a track portion to be read, characterized in that the centering detection means and the focussing detection means are constituted by a system of at least two radiation-sensitive detectors, which said at least two radiation sensitive detectors being disposed in the far field of the information structure at one side of a plane which is formed by the optical axis of the objective system means and a line which is parallel to the center line of the track portion to be read, said at least two radiation sensitive detectors being situated in an area around the point where the line which makes an angle of $\beta/2$ with the optical axis intersects the plane of the detectors, where β is the angle at which a first-order beam is diffracted in the lateral direction of the tracks.

4,006,294

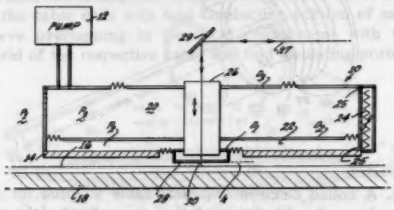
TRANSDUCER HEAD ASSEMBLY WITH FLUID BEARING AND HEAD HEIGHT CONTROL SYSTEM

Lawrence S. Canino, Redondo Beach, Calif., assignor to MCA Disco-Vision, Inc., Universal City, Calif.

Filed May 27, 1975, Ser. No. 580,749

Int. Cl.² G11B 7/12, 21/20

U.S. Cl. 358—127 **13 Claims**



1. A fluid servomechanism for controlling the separation between the surface of a moving information-bearing medium and a relatively fixed transducer head used in sensing the information in the medium, said servomechanism and said surface being immersed in an ambient fluid, said fluid servomechanism comprising:

a fixed and rigid housing positionable with an end wall thereof adjacent the surface of the medium, having a first chamber, and having a second chamber located between said first chamber and said end wall;

a first diaphragm forming a portion of said end wall of said housing to establish a sealed movable wall portion separating said second chamber from the ambient fluid;

a second diaphragm substantially parallel to said first diaphragm and separating said first chamber from the ambient fluid;

a third diaphragm located inside said housing between said first and second diaphragms and substantially parallel to them, and between said first and second chambers, each diaphragm being deformable in a direction substantially perpendicular to the surface of the medium;

rigid structural means connecting the deformable portions of said diaphragms constraining them to deform in the same direction by equal displacements, the transducer head being connected to said rigid structural means for movement therewith;

an orifice attached to said first diaphragm for movement therewith, said orifice connecting said second chamber with the ambient fluid adjacent said orifice;

a flow-restricting conduit joining said first chamber and said second chamber, having a flow resistance related in a predetermined way to the flow resistance of said orifice; and,

means for connecting a pump directly with said first cham-

ber for forcing fluid to flow in series through said pump, said first chamber, said flow-restricting conduit, said second chamber and said orifice.

4,006,295

METHOD OF DETECTING DEFECTS IN SIGNALS CORRESPONDING TO THE READ-OUT OF A DATA CARRIER AND SYSTEM FOR IMPLEMENTING SUCH A METHOD

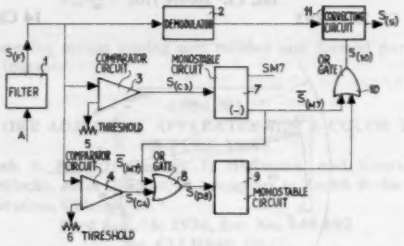
Pierre Oprandi, and René Romeas, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed July 21, 1975, Ser. No. 597,633

Claims priority, application France, July 23, 1974, 74.25492

Int. Cl.² H04N 5/76

U.S. Cl. 358—127 **5 Claims**



1. A method of detecting defects undergone by a read-out signal supplied from a reproducing system through the medium of a filter; said read-out signal being constituted by an angularly modulated carrier wave having a predetermined mean value of peak amplitude, and a frequency range extending above a predetermined lower frequency limit; said defects comprising drop-out and transients produced by said filter; said method comprising the steps of feeding said read-out signal to the respective first inputs of first and second comparator circuits; respectively biasing the second inputs of said first and second comparator circuits with a first and a second threshold voltage; adjusting said first threshold voltage below said mean value of peak amplitude; adjusting said second threshold voltage slightly above said mean value of peak amplitude; triggering a first monostable circuit with the first of said comparator circuits, said first monostable circuit having a relaxation duration higher than the reciprocal of said lower frequency limit; feeding the trigger input of a second monostable circuit with the output of a first OR gate having two inputs respectively supplied with signals from the complement output of said first monostable circuit and from the output of said second comparator circuit; and feeding a second OR gate with the signal supplied from said second monostable circuit and the signal supplied at said complement output for delivering a defect control signal.

4,006,296

METHOD OF AND APPARATUS FOR TESTING A TWO DIMENSIONAL PATTERN

Christopher Ernest Peterson, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

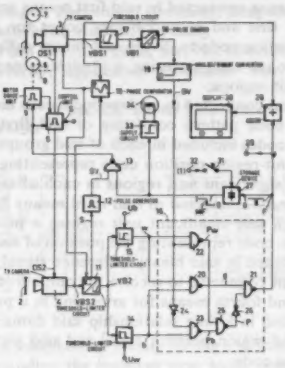
Filed June 26, 1975, Ser. No. 590,440

Claims priority, application Netherlands, July 22, 1974, 7409850

Int. Cl.² H04N 7/02

U.S. Cl. 358—106 **11 Claims**

2. Apparatus for inspecting a test object having a two-dimensional pattern by comparison thereof with a reference pattern comprising, first and second synchronized pick-up devices for scanning the test pattern and the reference pattern respectively, to derive first and second signals corresponding to the respective patterns scanned, said reference pattern comprising, first, second and third pattern traces having different brightness values with said first trace having a brightness value intermediate the brightness values of the second and third traces, the second and third traces being narrower in width than corresponding traces in the test pattern, an analog-to-binary converter, means coupling the input of the analog-to-binary converter to said first pick-up device, first and second threshold circuits coupled to said second pick-up device, one threshold circuit having a pass band for signals corresponding to low brightness values and the other having a pass



band for signals corresponding to high brightness values, said pass bands overlapping in an intermediate band corresponding to signals having intermediate brightness values, and an error detector coupled to the outputs of said first and second threshold circuits and to the output of said analog-to-binary converter for effectively comparing said first and second signals by comparing the binary valued signals corresponding to the test pattern with the signals from said first and second threshold circuits which correspond to said second and third traces representing the extreme brightness values in the reference pattern.

4,006,297

TELEVISION SIGNAL CODING SYSTEM

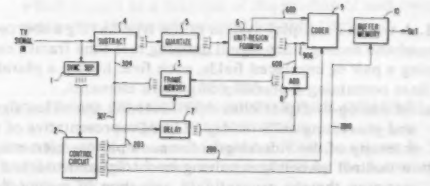
Toshio Koga, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 614,986

Claims priority, application Japan, Sept. 20, 1974, 49-108550

Int. Cl.² H04N 7/12

U.S. Cl. 358—136 **4 Claims**



1. A television signal coding system for coding a television signal by the use of frame correlation techniques, said television signal consisting of a series of frames each defined by horizontal and vertical synchronizing signals and each representing a number of two-dimensionally arranged picture elements of an optical image to be transmitted, said coding system including means for sequentially comparing every two successive frames to produce a binary difference signal con-

sisting of significant and insignificant digits representing respectively that the difference of said frame-to-frame comparison is greater and smaller than a predetermined value for each said picture element, said binary difference signal being deviated into a series of unit regions each having a predetermined number of binary digits; wherein the improvement further comprises:

first means responsive to said binary difference signal for generating a first or a second binary code for each said unit region depending on whether or not the unit region has said significant digits exceeding in number a predetermined value to designate significant regions;

second means connected to said first means and responsive to said first and second binary codes for generating a demarcation code to divide said binary difference signal into groups each covering a predetermined number of said unit regions;

third means connected to said second means and responsive to the code pattern consisting of said first and second binary codes included in each of said groups for generating a unit-region position code representing the position of said significant unit regions in each of said groups;

fourth means connected to said third means for generating for each said significant unit regions a picture element position code representing the position of each significant bit included in said binary difference signal; and

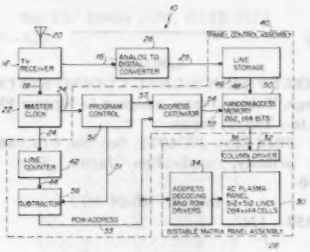
fifth means connected to receive the outputs of said second, third and fourth means for arranging in a predetermined order and in a time relationship said demarcation code, said unit-region position code, and said picture element position code.

4,006,298

BISTABLE MATRIX TELEVISION DISPLAY SYSTEM

Vernon John Fowler, Billerica, and Bruce Conrad Anderson, Tewksbury, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 20, 1975, Ser. No. 579,172
Int. Cl.² H04N 5/66
U.S. Cl. 358—240 **13 Claims**



1. A television display system of the type having a source of a baseband analog video signal defining real-time frames each having a pair of interlaced fields, each field having a plurality of lines containing a plurality of picture elements,

a. an analog-to-digital converter receiving the video signal and generating an N bit digital word representative of the intensity of the video signal for each picture element,

b. a control assembly receiving each digital word and in response thereto generating a sequence of output light pulse control signals for each word, the cumulative light pulse duration in time being directly proportional to the intensity of the analog video signal for each picture element, the sequence of light pulse control signals being effective to provide a full resolution, interlaced TV display, the sequence of control signals being such that the control signal corresponding to the least significant bit of the digital word occurs first and such that the control signal corresponding to the most significant bit of the digital word occurs last, the control assembly having a storage memory for storing the N bits digital words and having a bit storage requirement no greater than the maximum number of display elements in the display panel, and

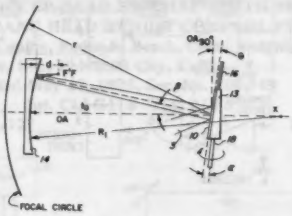
c. a bistable matrix display panel receiving the sequence of signals to generate a full-resolution, interlaced display with a full range of gray levels displayed.

4,006,299

FLAT FIELD SCANNING SYSTEM

David A. Grafton, Santa Monica, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 11, 1974, Ser. No. 531,848
Int. Cl.² H04N 1/02
U.S. Cl. 358—293 **14 Claims**



1. An optical scanning system comprising:

means for providing a beam of light,

rotatable planar reflective means for directing said beam upon rotation throughout a predetermined scan angle

means for rotating said planar reflective means, and

curved reflective means positioned adjacent said planar reflective means for imaging said beam as a spot and redirecting the beam directed thereto from said planar reflective means such that said spot traverses a flat focal plane, the plane of said planar reflective means being tilted at a first angle from an axis orthogonal to the optical axis of said curved reflective means, the axis of rotation of said planar reflective means being off-set at a second angle from the plane of said planar reflective means whereby said planar reflective means provides a linear traverse of said spot in the flat focal plane as said planar reflective means is rotated about its axis of rotation.

4,006,300

TWO-PIECE BACK FOR A CONSOLE TELEVISION RECEIVER

Melvin H. Boldt, Glenview; David P. Chuboff, North Barrington, and Robert W. Becker, Naperville, all of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

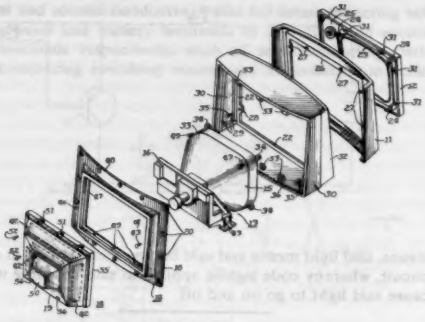
Filed Dec. 31, 1975, Ser. No. 645,489
Int. Cl.² H01J 29/02
U.S. Cl. 358—254 **7 Claims**

1. A back for a television receiver comprising:

a molded central portion including a generally rectangular peripheral section adapted to enclose a first receiver cabinet of similar dimension and an end bell section adapted to enclose the neck of an extending picture tube and assorted chassis parts;

a formed portion including a generally rectangular outer edge dimensioned to enclose a second receiver cabinet of greater dimension that said first receiver cabinet, and an

inner edge in engagement with the outer edge of said molded portion; and



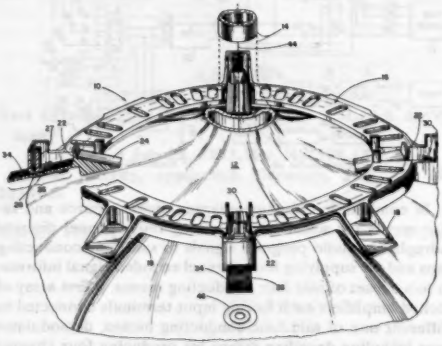
fastening means joining said molded and formed portions together.

4,006,301

YOKE ADJUSTING APPARATUS FOR A COLOR TV PICTURE TUBE

Dennis S. Bubacz; Guenter F. Hoffmann, and Konrad L. Schiecke, all of Chicago, Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed Jan. 16, 1976, Ser. No. 649,892
Int. Cl.² H04N *5/657*
U.S. Cl. 358—248 **7 Claims**



1. A yoke adjusting apparatus for use with a color television picture tube having a faceplate and a funnel aligned on a tube central axis wherein said funnel has a neck which contains an inline electron gun assembly for emitting at least one stream of electrons, said neck being connected to a flared portion ending in a mouth to which said faceplate is attached, said funnel having about said neck near said flared portion a yoke which forms a magnetic field for deflecting said stream of electrons for proper convergence of said tube, said yoke being held by a yoke mount, said yoke adjusting apparatus comprising;

a circumferential support about said funnel neck and attached to said flared portion of said funnel, and

a tilt adjusting means carried by said circumferential support and having a wedge-shaped portion selectably positionable between said yoke mount and said flared portion of said funnel to vary the attitude of said yoke mount, and thus said yoke, relative to said tube axis, thereby causing a change in the magnitude of said magnetic field of said yoke relative to said tube axis, and

locking means coupled between said tilt adjusting means and said circumferential support for engaging said tilt adjusting means to lock said wedge-shaped portion of said tilt adjusting means in a selected position between said yoke mount and said flared portion of said funnel corresponding to a desired attitude of said yoke, and

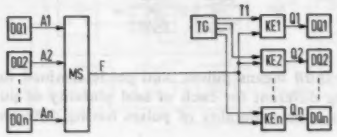
manually operable means for releasing said locking means to free said tilt adjusting means and thereby enable it to be retracted and the yoke readjusted.

4,006,302

SWITCHING ARRANGEMENT FOR EXTENDING THE RECEIVER STOP PULSE LENGTH IN TIME DIVISION MULTIPLEX TRANSMISSION

Konrad Reisinger, Zorneding, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 13, 1976, Ser. No. 658,121
Claims priority, application Germany, Mar. 13, 1975, 2511056
Int. Cl.² H04L *5/00*
U.S. Cl. 178—50 **2 Claims**



1. In a data transmission system having a switching arrangement for extending the receiver stop pulse length for time division multiplex (TDM) transmissions of telegraph signals on a character frame basis, each character frame having a start pulse, a number m code bits and one stop pulse, wherein a TDM signal is applied to a first bistable circuit and the output of the first bistable circuit is applied to a second bistable circuit from which a data signal is emitted to a data sink, the improvement comprising:

shift register means having at least a number $m+3$ storage cells, parallel input terminals receiving a stop signal, a clock pulse input terminal receiving clock pulses to be applied to said shift register means and a serial input terminal receiving a second binary digit whenever no stop signal is present,

gate means having input terminals for receiving an output signal from the $m+3$th storage cell of said shift register means and an output signal from said first bistable circuit, the gate means having an output terminal for producing stop signal,

counter means for receiving said stop signal as a signal to be counted and the output signal from the $m+3$th storage cell of said shift register means as a reset signal, said counter means producing counter reading signals for indicating the reading of said counter means and

means for producing phase shifted clock signals one of which is used as a function of the reading of said counter means for timing said second bistable circuit.

4,006,303

FILTERED TRANSITION DISTORTION CHANNEL QUALITY MONITOR

Peter Michael McManamon, Boulder, Colo., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 29, 1975, Ser. No. 644,471
Int. Cl.² H04L *25/06*
U.S. Cl. 178—69 A **5 Claims**

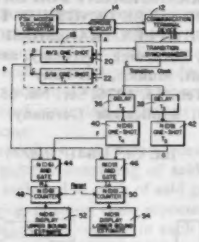
1. A DC transition monitor comprising:

first means for providing a DC pulse train output including information bit DC transitions, which, when they occur, do so at integral multiples of the information bit period t and also including an unknown number of spurious DC transitions at unknown intervals;

second means connected to said first means for outputting a pulse in response to each DC transition occurring in said DC pulse train;

third means connected to said first means for outputting a pulse at the end of each said bit period t;

fourth means for outputting a plurality of pulses, the leading edge of each of said plurality of pulses occurring after a predetermined time delay after the occurrence of each of



said third means pulses, said predetermined time delay being different for each of said plurality of pulses, and each of said plurality of pulses having different widths; and

N means each connected to said second means and to said fourth means for outputting a pulse each time there is a simultaneously occurring second means pulse and one of said fourth means plurality of pulses.

4,006,304

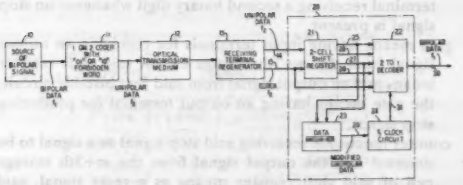
APPARATUS FOR WORD SYNCHRONIZATION IN AN OPTICAL COMMUNICATION SYSTEM

Darrell Dean Sell, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 10, 1975, Ser. No. 639,374

Int. Cl.² H04L *7/00*

U.S. Cl. 178—69.1 **4 Claims**



1. Apparatus for decoding a binary pulse stream wherein binary digits have been encoded as binary words to represent the three levels in a bipolar signal and one of the binary words represents a forbidden word, comprising decoder means having a control input for decoding each of said binary words into a bipolar voltage level in response to a clocking pulse at its control input, means for generating energizing pulses in response to the detection of said forbidden word in said binary pulse stream, and a clocking circuit responsive to said energizing pulses for developing clocking pulses at the control input of said decoder means.

4,006,305

BLINKER PRACTICE LIGHT

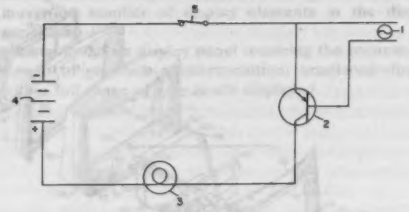
Emmett A. Hanratty, 966 W. 9th St., No. F., San Pedro, Calif. 90731

Filed Oct. 16, 1975, Ser. No. 623,270

Int. Cl.² G09B *19/26;* **H04L** *15/03*

U.S. Cl. 178—115 **1 Claim**

1. A code practice blinker light consisting only of coupling means adapted to be coupled to a source of code signals, solid state switch means, said switch means being connected to said coupling means, light means, battery means, said switch



means, said light means and said battery means being in series circuit, whereby code signals applied to said coupling means cause said light to go on and off.

4,006,306

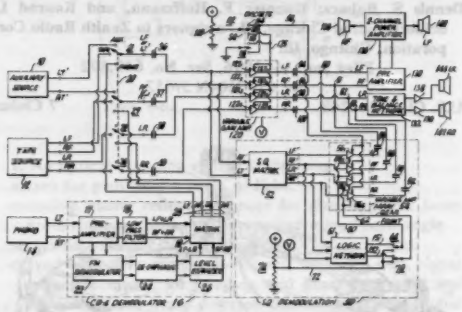
AUDIO SIGNAL PROCESSING APPARATUS

Norman Joseph Driscoll, Westwood, N.J., assignor to Yudin Industries, Inc., Murray Hill, N.J.

Filed Oct. 10, 1975, Ser. No. 621,534

Int. Cl.² H04R *5/00*

U.S. Cl. 179—1 GQ **11 Claims**



1. In combination, four conducting means, source and selector means for selectively supplying four channel discrete quadraphonic audio program signals to said four conducting means and for supplying four channel encoded signal information to a subset of said four conducting means, a first array of switched amplifiers each having input terminals connected to a different one of said four conducting means, demodulator means including decoding means for producing four channel signals from two input signals having inputs connected to said subset of said four conducting means, a second array of switched amplifiers each receiving a different one of said four demodulated four channel signals from said demodulator means, plural linear junction means each connected to the outputs of a different pair of switched amplifiers in said first and second amplifier arrays, and discrete-demodulated four channel program selection means including means for enabling one of said amplifier arrays and means for disabling the other of said amplifier arrays.

4,006,307

IMPULSE NOISE SUPPRESSION CIRCUIT

Daniel Danielsen, Wheaton; Kermit Shoff Dunlap, Naperville; George Haugk, St. Charles, and Richard Barton Sanderson, Lisle, all of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 9, 1975, Ser. No. 594,192

Int. Cl.³ H03K *17/00*

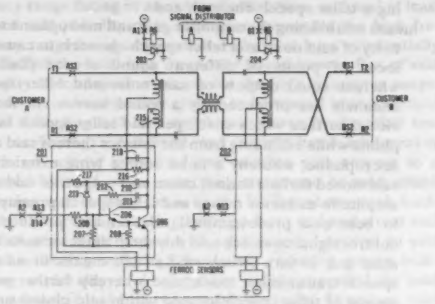
U.S. Cl. 179—1 P **4 Claims**

1. A transmission circuit for a communication switching system comprising:

at least one port comprising first and second terminals;

a source of direct current power comprising a ground terminal and a battery terminal;

first and second conducting paths for interconnecting said ground and battery terminals to said first and second terminals respectively, each of said conducting paths comprising switching means and an inductor in series



therewith, and said conducting path for connecting said battery terminal to said second terminal further comprises potential control means for selectively ramping the rise and fall of the potential connected to said second terminal; and further switching means coordinated with said switching means in said first and second conducting paths for controlling said potential control means.

4,006,308

LOUDSPEAKER ARRANGEMENT

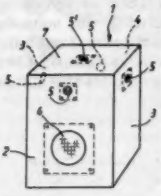
Karl Otto Pönsgen, Connollystrasse 14, 8 Munich 40, Germany

Filed July 22, 1975, Ser. No. 598,158

Claims priority, application Germany, July 25, 1974, 2435944

Int. Cl.² H04R *1/20*

U.S. Cl. 179—1 E **14 Claims**



1. A loudspeaker arrangement comprising an enclosure having a vertical axis and walls including a top wall; and a plurality of speakers including first-type speakers and at least one another type speaker, said first-type speakers having a high-frequency acoustic characteristic and said another type speaker having another frequency acoustic characteristic, said speakers having a high-frequency acoustic characteristic being mounted on said enclosure equi-angularly spaced from each other about said axis and so as to radiate sound signals in at least four directions orthogonal to said axis and at least one additional speaker having a high-frequency acoustic characteristic being mounted on said top wall of said enclosure and radiating sound signals only in the vertical direction, said speakers being so arranged as to radiate axis-symmetrically sound signals of different frequencies radiating by said speakers and to produce a uniform mixture of said sound signals.

4,006,309

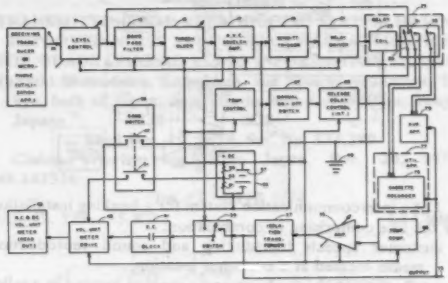
VOICE OPERATED RELAY

Millard S. Brickerd, Jr., Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 20, 1975, Ser. No. 624,208

Int. Cl.² H03F *3/72*

U.S. Cl. 179—1 VC **2 Claims**



1. A voice operated relay system for controlling the actuation of, and data signal input to, utilization means having an actuation signal input connection and a data signal input connection, said system comprising:

input means for providing an audio frequency data signal;

an adjustable level control means, connected to said input means, for selectively attenuating said data signal to provide a level controlled data signal;

an adjustable gain output amplifier having its output connected to said data signal input connection of said utilization means;

relay means having first switch means for connecting a voltage source to said actuation signal connection of said utilization means, and having second switch means for connecting a portion of said level controlled data signal to said adjustable gain output amplifier;

bandpass filter means, connected to receive a portion of said level controlled data signal, for passing a level controlled and bandpass filtered signal;

adjustable threshold means, connected to said bandpass filter means and operative to pass only filtered signals exceeding a predetermined amplitude, for selectively adjusting the sensitivity of said system;

automatic gain control squelch amplifier means, connected to said threshold means and responsive to the signals passed thereby to provide automatic gain controlled signals as first and second outputs each corresponding to said signals passed by said threshold means;

Schmitt trigger means, responsive to said first output of said automatic gain control squelch amplifier means, for controlling actuation of said relay means;

a meter; and

a selector switch connected to said meter and operative between first and second positions to alternatively connect said meter to said second output of said automatic gain control squelch amplifier and to a portion of said output of said adjustable gain output amplifier;

whereby with said selector switch in one position said meter can be used in conjunction with said level control means and with said adjustable threshold means, and with said selector switch in the other position said meter can be used in conjunction with said adjustable gain amplifier.

4,006,310

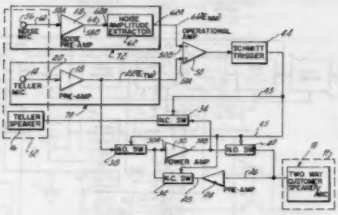
NOISE-DISCRIMINATING VOICE-SWITCHED TWO-WAY INTERCOM SYSTEM

Robert S. Bayer, Newfoundland, N.J., assignor to The Mosler Safe Company, Hamilton, Ohio

Filed Jan. 15, 1976, Ser. No. 649,402

Int. Cl.² H04M 9/10

U.S. Cl. 179—1 H **10 Claims**



1. An intercommunication system for a banking installation or the like comprising in combination:

customer speech transducing and sound reproduction means located at a customer location;

a teller speech microphone and a speaker located at a teller location subjected to ambient noise, said teller speech microphone and speaker being separate electrical components, said teller speech microphone being physically positioned at a first spatial point at said teller location accessible to said teller for facilitating placement of the mouth of said teller, which constitutes a source of teller speech, proximate said teller speech microphone when said teller wishes to speak;

power amplifier means with an input and an output for amplifying audio signals;

a teller speech preamplifier means connected to said teller speech microphone;

switch means interconnecting said teller speech preamplifier, said teller speaker and said customer speech transducing and sound reproduction means, said switch means being normally operative in a customer speech transmission mode to connect said customer speech transducing means to said power amplifier input and to connect said power amplifier output to said teller speaker to facilitate transmission of customer speech from said customer location to said teller location, said switch means being selectively operative in a teller speech transmission mode to connect said teller speech preamplifier to said power amplifier input and to connect said power amplifier output to said customer sound reproduction means to facilitate transmission of teller speech from said teller location to said customer location;

switch control means including:

a. a two state threshold detector having an output connected to said switch means, said threshold detector being normally operative in a customer state to place said switch means in said customer speech transmission mode and selectively operative in a teller state to place said switch means in said teller speech transmission mode,

b. a noise microphone located at said teller location at a second spatial point spaced from said first spatial point whereat said teller speech microphone is located,

c. a noise preamplifier connected to said noise microphone,

d. noise amplitude extractor means connected to said noise preamplifier for providing an output signal having a level correlated to the amplitude of amplified noise output from said noise preamplifier, said output signal level being substantially independent of the frequency and phase of said amplified noise output from said noise preamplifier, and

e. control signal means responsive to the outputs of said noise amplitude extractor means and said teller speech preamplifier for providing a control signal to said threshold detector when said outputs of said noise amplitude extractor means and said teller speech preamplifier bear a predetermined relation for switching said threshold detector to its teller state which in turn causes said switch means to switch to its teller speech transmission mode;

said noise microphone, noise preamplifier and noise amplitude extractor means defining a noise channel, said teller speech microphone and teller speech preamplifier defining a teller speech channel; and

means establishing the amplifier gain and microphone sensitivity of said noise and teller speech channels to cause the locus of points of different sound source positions, whereat equal outputs of said noise and teller speech channels are produced by a sound source, to form a closed surface which envelopes said teller speech microphone while excluding from the interior thereof said noise microphone, whereby a noise source lying exteriorly of said closed surface cannot cause said outputs of said noise amplitude extractor means and teller speech preamplifier to bear said predetermined relation and produce said control signal to switch said threshold detector to its teller state and in turn switch said switch means to its teller speech transmission mode, and whereby further only a source of teller speech located within said closed surface in the absence of a noise source within said closed surface can cause said outputs of said noise amplitude extractor means and teller speech preamplifier to bear said predetermined relation to cause said threshold detector to switch to its teller state and in turn said switch means to switch to its teller speech transmission mode to facilitate transmission of teller speech from said teller location to said customer location.

4,006,311

STEREOPHONIC SOUND REPRODUCING APPARATUS

Stig Carlsson, Torkel Knutssonsgatan 15, Stockholm, Sweden

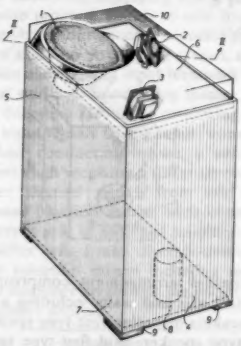
Continuation of Ser. No. 498,573, Aug. 19, 1974, abandoned.

This application Feb. 11, 1976, Ser. No. 657,226

Claims priority, application Sweden, Aug. 24, 1973, 7311562

Int. Cl.² H04R 1/02, 5/02

U.S. Cl. 179—1 GA **7 Claims**



1. A loudspeaker for use in a stereophonic or quadraphonic sound reproducing system in a room having at least one substantially vertical wall, comprising a casing having a front end and a rear end and intended to be placed with said rear end nearest to said vertical wall, at least one loudspeaker means arranged in said casing so as to provide, near said rear end of the casing, a midfrequency sound radiation source as well as a low frequency sound radiation source, and a plurality of loudspeaker means facing in widely diverging directions, of which loudspeaker means at least one is located near said front end of the casing and faces in a rearwardly direction, arranged to

radiate the high frequency components of the sound, said at least one loudspeaker means for the midfrequency range and at least one of said plurality of loudspeaker means for the high frequency range being oriented to face asymetrically slantwise forwards and sidewards towards a space located on one side of a vertical medial plane extending from the front end to the rear end of said casing at right angles to the rear wall of said casing, said at least one loudspeaker means for the midfrequency range facing in an upwardly direction, and said at least one of said plurality of loudspeaker means for the high frequency range being arranged to radiate at least substantially one-half of the total high frequency sound-energy flux of said plurality of loudspeaker means for the high frequency range.

7. A stereo loudspeaker system to be placed near a vertical sound reflecting wall in a room, said stereo loudspeaker system comprising a left-hand and a right-hand loudspeaker which are mirror images of one another with respect to a centered vertical plane extending transverse to said sound reflecting wall midway between the loudspeakers; each loudspeaker comprising a casing having a front end and a rear end and intended to be placed with said rear end nearest to said sound reflecting wall, high frequency radiating means comprising a plurality of loudspeaker means mounted on said casing and oriented to face in widely diverging directions, said plurality of loudspeaker means including at least one loudspeaker means which provides direct sound in the room and faces in a forwardly and sidewardly direction pointing slantwise towards said centered vertical plane, said plurality of loudspeaker means including at least another loudspeaker means which provides reflected sound in the room and faces in at least a rearwardly direction to cooperate with said sound reflecting wall, said at least one loudspeaker means which provides direct sound in the room radiating at least substantially one-half of the total sound-energy flux of said high frequency radiating means, and mid and low frequency radiating means comprising at least one loudspeaker means mounted to said casing, near said rear end of the casing, said at least one loudspeaker means for the midfrequency range being oriented to face in an upwardly and forwardly and sidewardly direction pointing slantwise towards said centered vertical plane.

4,006,312

SOUND RECORDING AND REPRODUCING MACHINES

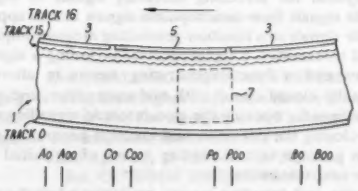
Leonard Rubenstein, 27 Chessington Court, London N.3, and Stephen Perrin Robinson, Lyon Way, Frimley Road, Camberley, Surrey, both of England

Continuation-in-part of Ser. No. 523,535, Nov. 13, 1974, abandoned. This application Jan. 8, 1975, Ser. No. 539,591

Claims priority, application United Kingdom, Nov. 14, 1973, 52793/73; May 14, 1974, 21368/74

Int. Cl.² H04M *11/00*

U.S. Cl. 179—6 R **9 Claims**



1. A sound recording and reproducing machine in which information is recorded on an endless recording medium in a series of tracks which extend lengthwise of the medium at locations mutually spaced in a direction laterally of the medium, the machine comprising sound recording and reproducing means, means for driving the recording medium along a predetermined path within which information is recorded on or reproduced from the medium by the recording and reproducing means, and control means adapted, when a plurality of electrical signals each representing information are applied to the machine in sequence, to actuate the driving means and the sound recording and reproducing means so that the said tracks are formed in a predetermined order, and further adapted, when an electrical command signal for reproducing the information is applied to the machine, to actuate the driving means and the sound recording and reproducing means so that the recorded information is reproduced from the tracks in the reverse order from the order in which the tracks were formed.

4,006,313

TRANSMITTING AND REPRODUCING SYSTEM HAVING IMPROVED NOISE REDUCTION CHARACTERISTICS FOR QUADRAPHONIC AUDIO INFORMATION SIGNALS

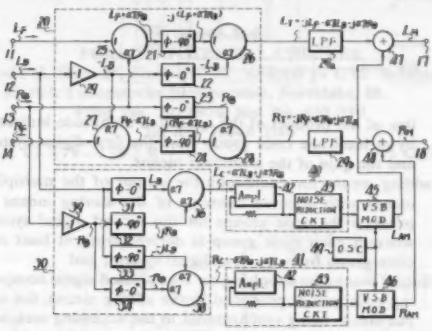
Takeshi Matsudaira, Kamakura, and Shoichi Nakamura, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 19, 1974, Ser. No. 534,299

Claims priority, application Japan, Dec. 20, 1973, 48-143326

Int. Cl.² G11B *3/74*

U.S. Cl. 179—15 BT **13 Claims**



1. A system in which multiple signals are selectively combined, said system comprising:

A. an encoder to receive at least first, second, and third signals and to combine said three signals in predetermined amplitude and phase relationship to produce an unmodulated signal;

B. a carrier source;

C. a vestigial side band modulator connected to said carrier source and connected to receive at least said second signal as a modulating signal at a predetermined phase and amplitude relative to the phase and amplitude of said second signal applied to said encoder and to modulate the carrier therewith; and

D. a combining circuit connected to said encoder and to said modulator to combine said unmodulated signal and the vestigially modulated signal as a composite signal.

4,006,314

DIGITAL INTERFACE FOR RESYNCHRONIZING DIGITAL SIGNALS

Joseph Henry Condon, Summit, and Robert Bruce Kieburtz, Fair Haven, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 29, 1976, Ser. No. 653,349

Int. Cl.² H04J *3/06*

U.S. Cl. 179—15 BS **14 Claims**

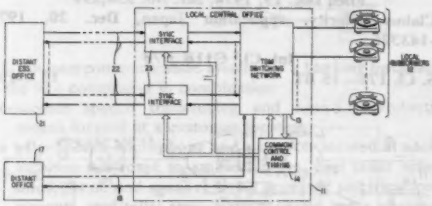
1. Apparatus for communicating digital signals comprising code groups between two digital systems wherein a first digital system is synchronized by a first time base and a second digital system is synchronized by a second time base independent of the first time base in frequency and phase, the apparatus comprising:

storing means in circuit relationship with the first digital system, the storing means receiving and retaining code groups derived from the code groups of the first digital system at a first rate synchronized in accordance with the first time base,

accessing means for obtaining the contents of the storing means at a second rate synchronized in accordance with the second time base, the accessing means also controlling the occurrence of the code groups for the second digital system,

timing means for measuring the relative occurrence of the code groups for the second digital system with respect to the occurrence of the code groups produced by the first digital system,

multiplier means in circuit relationship with the storing means having variable gain controlled by the timing means, the multiplier means producing an output indica-



tive of the product of the quantized amplitude indicated by at least one code group from the first digital system and the gain of the multiplier means,

adding means for combining the output of the multiplier means with selected contents of the storing means to produce the code groups for the second digital system wherein each code group is derived from at least one code group from the first digital system, and

output means for supplying an interpolated signal comprising code groups produced by the adding means, the output means being synchronized to the accessing means so as to supply an interpolated signal compatible with the second digital system whereby the timing means and the multiplier means accommodates differences in frequency and phase between the first and second time bases by preserving substantially the same information content in the interpolated signal as that indicated by the digital signal from the first digital system.

4,006,315

INDUCTIVE-CARRIER COMMUNICATION SYSTEMS

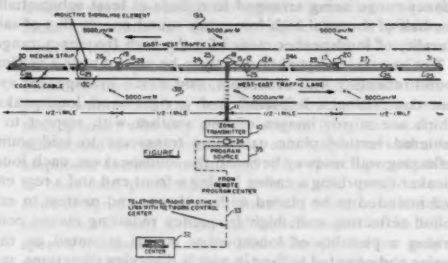
William S. Halstead, Woodland Hills, Calif., assignor to Carrier Communications, Inc., New York, N.Y.

Division of Ser. No. 428,691, Dec. 27, 1973, Pat. No. 3,975,700, which is a continuation of Ser. No. 160,316, July 7, 1971, abandoned, which is a division of Ser. No. 632,699, April 21, 1967, Pat. No. 3,609,247. This application Aug. 7, 1975, Ser. No. 602,561

Int. Cl.² H04B *5/00*

U.S. Cl. 179—82 **27 Claims**

1. A transportation route communication system of inductive-signaling type comprising a carrier-wave generator, means for modulating carrier-wave energy from said generator, means coupling the output of said generator to a coaxial cable having a center conductor and extending parallel to a transportation route served by the system, dielectric means about said center conductor, a conducting sheath formed about said dielectric means and held at ground potential, a second dielectric means about said sheath, a first inductive-signaling conductor formed along said second dielectric means extending for the length of a first transmission zone along said route, a first coupling means connecting said center conductor and said first inductive-signaling conductor whereby a controlled amount of carrier-wave energy may be transferred from said center conductor to said first inductive-signaling conductor, a first terminating means at the end of said first inductive-signaling conductor, said first terminating means connecting the end of said inductive-signaling conductor to said conducting sheath at ground potential, a second inductive-signaling conductor formed along said dielectric means and extending for the length of a second transmission zone along said route spaced from said first transmission zone,



a second coupling means connecting said center conductor of said coaxial cable and said second inductive-signaling conductor whereby a controlled amount of carrier-wave energy may be transferred from said carrier conductor to said second inductive-signaling conductor, and a second terminating means at the end of said second inductive-signaling conductor, said second terminating means connecting the end of said second inductive-signaling conductor to the conducting sheath of said coaxial cable at ground potential.

4,006,316

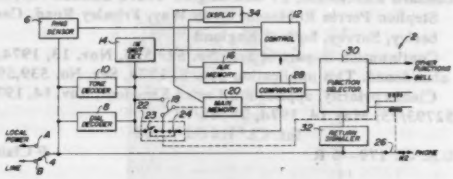
CODE-CONTROLLED DETECTION AND FUNCTION ACTUATING SYSTEM

Duane Ridgely Bolgiano, Bala Cynwyd, Pa., assignor to International Mobile Machines Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 496,450, Aug. 12, 1974, Pat. No. 3,936,617. This application Oct. 28, 1975, Ser. No. 626,021

Int. Cl.² H04M *3/38*

U.S. Cl. 179—84 R **11 Claims**



1. A system for screening incoming signals to separate acceptable signals from unacceptable signals and to apply the acceptable signals to a function-generating means comprising:

a signal transmitter, a signal receiver including a signalling means and a functiongenerating means in alternative normally-closed circuit with said transmitter, and a sensing means for opening the circuit to said signalling means and closing the circuit to said function-generating means upon passage to said sensing means of an initial signal from said transmitter;

a detector and decoding means, operative when the circuit between said signal transmitter and said function-generating means is closed, for separating selected transmitted signals from unselected transmitted signals by filtering out the unselected signals, and serially converting the selected signals into data bits representing digits;

a memory means comprising a main memory and an auxiliary memory, each adapted to serially pass digit-forming data bits therethrough, said auxiliary memory receiving data bits from said detector and decoding means;

a programming means for directly and selectively programming said main memory with selected digits;

a comparator means for comparing the output of said auxiliary memory with the output of said main memory to obtain an acceptable signal when said outputs match;

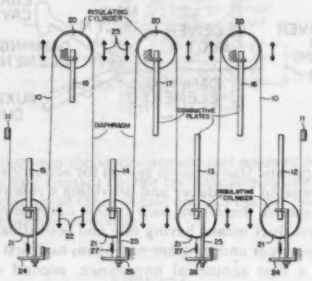
and means for transmitting said acceptable signal to said function-generating means.

4,006,317

ELECTROSTATIC TRANSDUCER AND ACOUSTIC AND ELECTRICAL SIGNAL INTEGRATOR

Miller L. Freeman, 4221 Kling St. No. 4, Burbank, Calif. 91505

Filed Feb. 14, 1975, Ser. No. 549,867
Int. Cl.² H04R *19/00*
U.S. Cl. 179—111 R **17 Claims**



2. An electrostatic transducer of the folded type arranged to be partially driven by electric signals and partially by acoustic waves, said transducer comprising:

a. a plurality of electrically conductive plates disposed in substantially parallel spaced planes;

b. an electrically conductive, flexible diaphragm forming a continuous loop, each of said plates extending only along a portion of the area of its associated diaphragm portion;

c. means for spacing said diaphragm from and disposing it substantially parallel to said plates and for tensioning said diaphragm; and

d. means for generating a steady electric field between said plates and said diaphragm and for applying an electric signal between alternate plates, whereby the diaphragm portions which are not coextensive with said plates are capable of being acoustically excited in phase with the diaphragm portions coextensive with said plates.

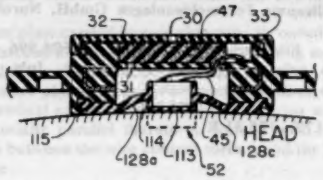
4,006,318

INERTIAL MICROPHONE SYSTEM

George J. Sebesta, Huntington Bay; Alan Hofer, Wantagh, and Richard W. Carlisle, Elmsford, all of N.Y., assignors to Dyna Magnetic Devices, Inc., Hicksville, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,996
Int. Cl.² H04M *1/05*; H04R *1/10*
U.S. Cl. 179—121 C **6 Claims**

1. A microphone adapted to be worn in contact with the head of a wearer to pick up the speech of the wearer and to severely attenuate ambient sounds, consisting of an inertial reaction transducer, an acoustical enclosure, support means for said transducer, and an acoustical labyrinth, the support means for said transducer including relatively thin compliant suspension means made from rubber-like elastomer material, the support means including a protuberance normally extending outward from the plane of the suspension means but adapted to be deflected inwardly of the acoustical enclosure when said microphone is applied to the head of a wearer, said



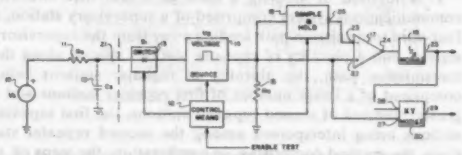
acoustical labyrinth constituting acoustical filter means for excluding at least high frequency ambient sound.

4,006,319

FOREIGN POTENTIAL CHECKER

Todd H. Gartner, Elmhurst, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Jan. 22, 1976, Ser. No. 651,310
Int. Cl.² H04B *3/46*
U.S. Cl. 179—175.3 R **16 Claims**



1. In a telephone system of the type having telephone lines and a switching network, wherein operating voltage sources are maintained on the lines to support telephone communication and wherein each line and the network combine to form an equivalent voltage source and an equivalent voltage source impedance, a monitoring system for indicating the magnitude of the real part of the equivalent voltage source impedance comprising:

a voltage source coupled to a selected one of the lines and operable for providing a constant voltage in opposition to the equivalent source voltage;

voltage sensing means coupled to the side of said voltage source opposite the selected line;

control means for activating and causing said voltage source to provide said constant voltage for a predetermined period of time sufficient to cause a first steady state voltage to appear at said voltage sensing means and for deactivating said voltage source at the end of said predetermined period of time to cause a second steady state voltage to appear at said voltage sensing means;

subtracting means coupled to said sensing means for determining the difference between the magnitudes of said first and second steady state voltages; and

indicating means coupled to said subtracting means for providing an output voltage which is inversely related to said difference determined by said subtracting means and directly related to the real part of said equivalent source impedance for providing a direct indication of the magnitude of the real part of said equivalent source impedance.

4,006,320

FAULT LOCATING SYSTEM AND METHOD FOR TRANSMISSION LINES AND REPEATER STATIONS

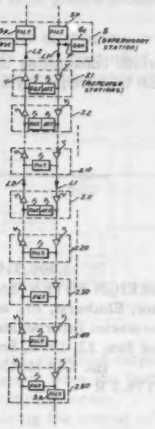
Georg Märkl, Nurnberg, Germany, assignor to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH, Nurnberg, Germany

Filed July 25, 1975, Ser. No. 598,996

Claims priority, application Germany, July 27, 1974, 2436373

Int. Cl.² H04B 3/46

U.S. Cl. 179—175.31 R 20 Claims



1. A method of locating a fault in a four-wire two-way communications system comprised of a supervisory station, a four-wire transmission path leading away from the supervisory station, and a plurality of repeater stations spaced along the transmission path, the plurality of repeater stations being comprised of a lesser number of first repeater stations and a greater number of second repeater stations, the first repeater stations being interspersed among the second repeater stations, the method comprising, in combination, the steps of: at each first repeater station connecting between the outgoing and incoming lines a respective one of a plurality of first coupling networks each having the same first transfer function; at each second repeater station connecting between the outgoing and incoming lines a respective one of a plurality of second coupling networks each having the same second transfer function, different from the first transfer function; producing a waveform comprised of first pulses and distinguishable second pulses, the first pulses being interspersed among the second pulses in correspondence to the interspersing of the first repeater stations among the second repeater stations, the producing of the first pulses comprising applying a single test pulse to the outgoing line at the supervisory station and deriving all the first pulses from such single test pulse by permitting the single test pulse to travel from the supervisory station along the outgoing line to the individual first repeater stations, through the associated first coupling networks and back to the supervisory station along the incoming line with the different travel times of the single test pulse from and back to the supervisory station via the different ones of the first repeater stations accounting for the spacing of the first pulses within said waveform, the producing of the second pulses comprising applying a single test pulse to the outgoing line at the supervisory station and deriving all the second pulses from such single test pulse by permitting the single test pulse to travel from the supervisory station along the outgoing line to the individual second repeater stations, through the associated second coupling networks and back to the supervisory station along the incoming line with the different travel times of the single test pulse from and back to the supervisory station via the different ones of the second repeater stations accounting for the spacing of the second pulses within said waveform, the fewer first pulses serving to facilitate counting of pulses in the waveform, the number of first and second pulses in the waveform being equal to the number of first and second repeater stations when no faults are present, when a fault is present the pulses missing from the waveform indicating which repeater stations are located beyond the fault.

4,006,321

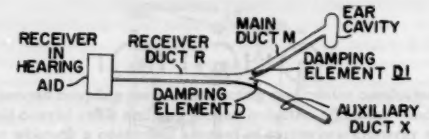
TRANSDUCER COUPLING SYSTEM

Elmer V. Carlson, Prospect Heights, Ill., assignor to Industrial Research Products, Inc., Elk Grove Village, Ill.

Continuation of Ser. No. 444,036, Feb. 20, 1974, abandoned. This application June 14, 1976, Ser. No. 695,329

Int. Cl.² H04R 1/22, 25/00

U.S. Cl. 179—180 6 Claims



1. An acoustic transmission system for acoustically coupling to an associated transducer and providing a relatively smooth output response therefrom, said system comprising in combination, first duct means having one end acoustically coupling to the transducer and its other end open, said first duct means effecting a first acoustical impedance, second duct means having one end acoustically connected to said first duct means, the other end of said second duct means which is remote from the first duct means being acoustically blocked, acoustic damping means in said second duct means, and said acoustic damping means having the characteristic impedance of said second duct means.

4,006,322

AUXILIARY INTERLOCK SWITCH WITH INTERCHANGEABLE AND REVERSIBLE CHISEL-SHAPED CONTACTS AND SPRING BIASING MECHANISM

Paul M. Gallatin, Brookfield, and Edward A. Halbach, Milwaukee, both of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sept. 22, 1975, Ser. No. 615,688

Int. Cl.² H01H 15/00, 1/12, 45/00

U.S. Cl. 200—16 A 17 Claims

1. An electrical circuit making and breaking interlock switch comprising, in combination,

a hollow insulating housing having at least two pair of stationary contact posts projecting inwardly from a wall thereof,

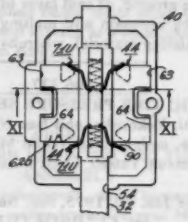
an insulating contact carrier mounted for reciprocation through said housing and being accessible from the housing exterior, said contact carrier having a spring-receiving cavity therein and elongated first and second abutment-receiving apertures extending therethrough which register with opposite ends of said spring-receiving cavity,

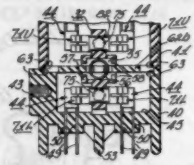
an abutment member adapted to be releasably assembled to said contact carrier and extend freely through one of said abutment-receiving apertures so that said contact carrier is movable relative thereto and having its ends in engagement with opposed walls of said housing to prevent movement thereof as said contact carrier reciprocates,

a helical return spring compressed within said spring-receiving cavity and reacting at one end against said abutment member assembled within said one abutment-receiving

aperture to normally resiliently bias said contact carrier against reciprocation in one direction, and

a pair of unitary metallic bridging contacts carried by said contact carrier each of which is adapted to engage and





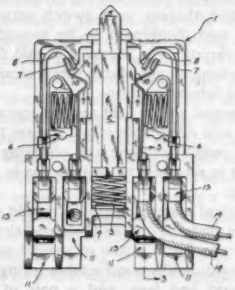
bridge between the stationary contact posts of one of said pairs as said contact carrier reciprocates in one direction and to disengage them as said contact carrier reciprocates in the opposite direction.

4,006,323

ELECTRICAL TERMINAL STRUCTURE

Terrance D. Nelson, Milwaukee, and Donald W. Kuntzsch, West Allis, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed May 21, 1975, Ser. No. 579,517
Int. Cl.² H01R 7/12
U.S. Cl. 200—284 **7 Claims**



1. A switch cartridge, the combination comprising:

a plunger within the cartridge framework;

a switch mounted within the cartridge framework to one side of the plunger and which is actuated by the axial movement thereof;

said switch including a pair of contacts, one of which has a contact end, the contact end extending into a receptacle in the cartridge framework;

a terminal member attached to the contact end and having a terminal surface within the receptacle;

a terminal housing wedgingly retained within the receptacle and having an interior terminal support member which is configured to receive and retain said terminal member;

said terminal member having a portion conforming to the terminal support and mating with the terminal support member to provide a firm union between the contact end and the terminal housing;

an elongated threaded fastener within said terminal housing;

a pressure plate carried by said elongated threaded fastener and restrained against rotation during turning movement of said elongated threaded fastener;

said pressure plate having a wire contact surface opposing the terminal surface of said terminal member and being substantially parallel thereto to form a wire receiving mouth between the wire contact surface and the terminal surface;

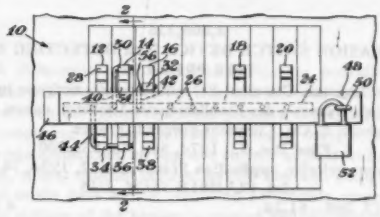
the wire contact surface being brought into contact with a wire when inserted between the wire contact surface and the terminal surface by rotation of said elongated threaded fastener to provide a direct contact between the wire and said terminal member in said switch cartridge.

4,006,324

ELECTRICAL DISTRIBUTION PANEL LOCKOUT MEANS FOR SWITCH ACTUATORS

Arthur L. Leasher, Beaverton, and Lawrence F. Sanborn, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 2, 1975, Ser. No. 619,120
Int. Cl.² H01H 27/10
U.S. Cl. 200—42 T **8 Claims**



1. In an electrical distribution box wherein there are a plurality of spaced apart vertical rows of horixontally disposed circuit breakers each of which has an end including an actuator element extending through the front cover plate of said box, each actuator element having a bore extending vertically therethrough the improvement comprising a bar-like member being secured to said front cover and disposed between a pair of vertical rows of circuit breakers, said bar-like member having an array of bores opening to the outwardly extending face of said bar-like member, a locking element having a rod-like arm part and first and second end parts, said first end part extending into the bore in an actuator element and said second end part extending into a bore in said bar-like member, and end secured bar cover plate means extending closely over said bar-like member.

4,006,325

OFFSET PIVOT GROUND SWITCH

Calvin E. Redfern, Portland, Oreg., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 19, 1975, Ser. No. 633,420
Int. Cl.² H01H 31/00
U.S. Cl. 200—48 A **10 Claims**

1. In a disconnect ground switch comprising three individual switch assemblies, one per phase;

a frame;

an insulator for each phase switch, said insulators being carried by said frame;

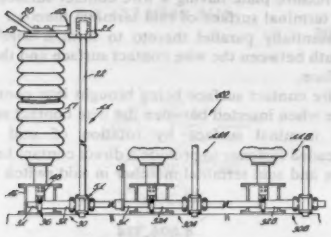
a fixed contact carried by each insulator;

an interphase support shaft extending between said phase

switches, said interphase support shaft being carried by said frame for bodily movement about an axis;

a blade switch for each phase switch, said blade switches being movable into and out of engagement with an associate, one of said fixed contacts;

means operably connecting each blade switch to said interphase support shaft; and



actuating means operably connected to effect bodily movement of said interphase support shaft bodily about said axis,

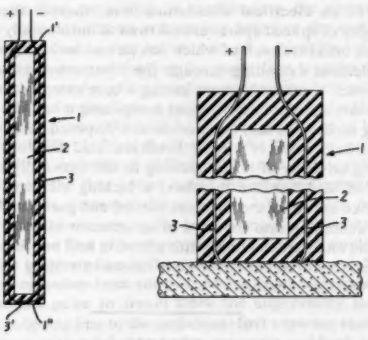
whereby bodily movement of said interphase support shaft about said axis in one direction effects the bodily movement of said blade switches into engagement with said associated fixed contacts and the mass moving about the pivot axis serves as a counterbalance.

4,006,326

ABRASION SWITCH DEVICE FOR DETECTING LOW TIRE PRESSURE

Daniel Lejeune, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France

Filed Dec. 23, 1974, Ser. No. 535,700
Claims priority, application France, Jan. 2, 1974, 74.00097
Int. Cl.² H01H *35/24, 3/16*
U.S. Cl. 200—61.24 **4 Claims**



1. An alarm device for installation on an automotive vehicle or the like to signal a substantial drop in the inflation pressure of the tires on the wheels of said vehicle, said device comprising an electric circuit which can be in an open or closed condition, which is normally in the open condition, and a change to the closed condition of which can be detected and a flexible rod adapted to be fastened to a fixed, unsuspended part of the vehicle, said rod having a free end adapted to be directed towards the ground, said free end being normally spaced apart from the ground but coming into contact with the ground upon a substantial drop in inflation pressure, said device being characterized in that said electric circuit comprises two blade conductors located at said free end which are covered with a layer of material of low resistance to wear by abrasion, said two blade conductors being separated from each other by a thin layer of an electrically insulating material which has a low melting point, said two blade conductors making contact with each other upon the wearing away, by contact with the ground, of said layer of material of low resistance to wear by abrasion and melting of said thin layer of electrically insulating material, whereby said circuit is closed.

4,006,327

PNEUMATIC TIRE PRESSURE SENSING SWITCH

Tadashi Hayashi, Yokosuka, and Isao Nisimura, Nagaokakyo, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Omron Tateisi Electronics Co., Kyoto, both of, Japan

Filed Jan. 29, 1975, Ser. No. 545,061
Int. Cl.² H01H *35/24*
U.S. Cl. 200—61.25 **18 Claims**

1. A pneumatic tire sensor switch comprising:

a casing having a tubular section, said tubular section having one end and an opposite end;

a switch housing having a switch chamber mounted in said casing to close said one end of said tubular section;

a diaphragm extending transversely of said tubular section, said diaphragm defining a first and a second space inside of said tubular section, said first space being disposed between said switch housing and said diaphragm, said first space being adapted to communicate with the inside of a pneumatic tire, said second space being adapted to communicate with the ambient atmosphere;

a switch actuator mounted to said switch housing for movement relative thereto, said switch actuator being connected to said diaphragm to be moved thereby in response to variations in pressure in said first space;

means comprising an adjustable screw closing said opposite end of said tubular section;

a spring arranged within said second space resting on one side upon said adjustable screw and on the opposite side upon said switch actuator and opposing switch actuator movement in response to an increase in pressure on said diaphragm;

a fixed electrical contact disposed in said switch chamber;

a snap action plate having an H-shaped slot formed therein which thereby forms a pair of spaced end legs, a pair of spaced longitudinally contractable springy side legs which connect said end legs, and a pair of aligned central mounting extensible legs which are spaced between said side legs, which extend from central portions of said end legs toward each other, and which are spaced at their adjacent ends;

a movable electrical contact carried by one of the end legs of said snap action plate;

said adjacent ends of said central mounting legs of said snap action plate being operatively connected to said switch actuator so as to be movable thereby on movement of said switch actuator;

stop means mounted in said switch chamber for preventing movement of the other one of said end legs of said snap action plate out of a plane normal to the movement of said switch actuator;

said snap action plate being mounted in said switch cham-

ber and deformable between two principal conditions, one wherein said movable electrical contact is in engagement with said fixed electrical contact and the other wherein said movable contact is out of engagement with said fixed electrical contact; and

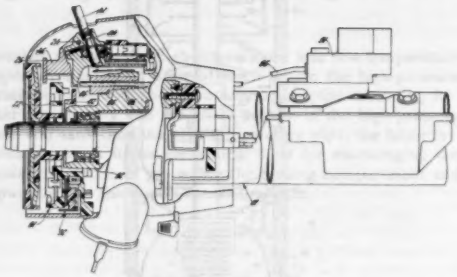
said adjustable screw, said spring, said switch actuator and said snap action plate being made of an electrically conductive material and serving as a conducting path for said movable electrical contact.

4,006,328

STEERING COLUMN MOUNTED MULTIPLE SWITCH ASSEMBLY

Dan R. Kimberlin, Frankenmuth, and Thomas J. Milton, Bay City, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 21, 1975, Ser. No. 569,604
Int. Cl.² H01H 9/00, 3/16
U.S. Cl. 200—61.54 **1 Claim**



1. A steering column mounted multiple switch assembly having a common actuator means comprising

a support on the steering column,

a direction signal switch means mounted on the support having an operating portion mounted for rocking movement substantialy about a first axis and including switch cancelling means on the operating portion, the operating portion comprising a molded generally annular element having an integral upstanding reinforcing rib,

a manually operable actuator means mounted on the support for rocking movement substantially about a second axis parallel to and laterally spaced from the first axis, the actuator means including a manually moveable actuator lever for controlling movement of the actuator means,

a transmission member comprising a rigid link having first and second ends, the link being fixedly secured at the first end to the actuator means for rocking movement therewith about the second axis so that the second end swings through an arc upon such rocking movement, the second end of the link extending to a region of the operating portion of the direction signal switch spaced from the first axis and terminating in a pair of spaced depending tangs loosely straddling the upstanding rib of the operating portion to effect rocking movement of the operating portion substantially about the first axis thereof upon rocking movement of the actuator means about the second axis,

auxiliary switch means carried by the steering column for actuation by movement of the actuator lever about a third axis,

and means mounting the actuator means for movement substantially about the third axis for operation of the auxiliary switch means

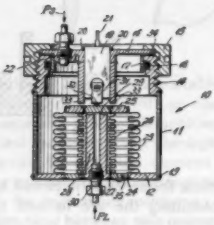
whereby selective movement of the actuator means about the second and third axes respectively, selectively actuates the respective switch means.

4,006,329

SWITCH FOR SENSING A SELECTED RATIO BETWEEN TWO DIFFERENT PRESSURES

Robert R. Hellman, Bridgeport, and Marion T. Mikita, Milford, both of Conn., assignors to Westport Development & Mfg. Co. Inc., Milford, Conn.

Filed May 14, 1975, Ser. No. 577,537
Int. Cl.² H01H 35/32
U.S. Cl. 200—83 D **2 Claims**



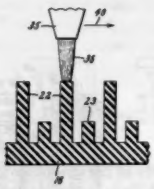
1. A differential pressure ratio device for providing an indication of the existence of at least one selected value of the ratio between the values of a small pressure and a large pressure comprising a closed housing having a base, a header having one surface and an opposite surface located within the housing, a first tubular bellows having one end completely secured to the base and its other end completely secured to the one surface of the header, a second bellows having one end completely secured to the base and its other end completely secured to the one surface of the header, said second bellows being smaller than said first bellows whereby they form a closed annular chamber with the base and the one surface of the header, means causing a set low absolute pressure to exist in the annular chamber, means adapted to introduce a large pressure into the interior of the second bellows to act on the one surface of the header enclosed by the second bellows, means adapted to introduce a small pressure into the closed housing to subject the opposite surface of the header thereto, means for providing an indication of at least one position of the header, the effective area of the opposite surface subjected to the small pressure being essentially equal to the selected value of the pressure ratio times the effective area of the one surface subjected to the large pressure within the second bellows, said means for providing an indication including an electrical switch having an actuator portion adapted to engage the opposite surface and terminals extending through the closed housing with the switch being located to be actuated at the position which the opposite surface of the header assumes at the selected value of the ratio and in which there are alterable means for adjusting the location of the switch with respect to the header, said alterable means including means forming the housing in two separable parts, one of said parts having the base to which the bellows carrying the header are secured, the other part having means for supporting the electrical switch and joining means for connecting the two parts to enable relative movement of the switch with respect to the header to enable adjustment of the location of the switch.

4,006,330

CIRCUIT BREAKER ARC CHUTE HAVING COMPONENTS OF REFRACTORY INORGANIC MATERIAL WITH SURFACES OF AN AMORPHOUS FUSED MATERIAL, A MAJOR PROPORTION OF WHICH IS SILICA, AND METHOD FOR MAKING SAME

Richard M. Korte, West Chester, Pa., and John E. Zlupko, Marlton, N.J., assignors to General Electric Company, Philadelphia, Pa.

Filed Apr. 16, 1975, Ser. No. 568,544
Int. Cl.² H01H *33/08*
U.S. Cl. 200—144 C **10 Claims**



1. An arc chute for an electric circuit breaker comprising a portion for confining the arc formed upon circuit-breaker opening,

a. said portion being of an electric insulating material comprising the heat and pressure reacted thermoset product of a mixture of chrysotile asbestos fibres, orthophosphoric acid, and silica sand;

b. said silica sand being present in said mixture in an amount of between 23.5 and 30.5 precent by weight of the mixture;

c. said phosphoric acid being present in said mixture in an amount of about ½ part by weight to each part by weight of asbestos fibres; and

d. said asbestos fibre in the mixture being characterized by a fibre length sufficiently great as to preclude substantial warping of said arc-chute portion when cooled to room temperature following baking, and

e. said insulating material prior to operation of said arc chute having a surface layer formed by subjecting the pre-existing surface of said material to arc-plasma flame treatment that converts the material at said surface to an amorphous fused material, the major proportion of which by weight is silica.

4,006,331

VACUUM INTERRUPTER FOR HIGH VOLTAGE APPLICATIONS

Donald W. Crouch, Newtown Square, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Aug. 27, 1975, Ser. No. 608,368
Int. Cl.² H01H *33/66*
U.S. Cl. 200—144 B **5 Claims**

1. A vacuum-type circuit interrupter comprising:

a. a highly evacuated envelope comprising a tubular insulating housing and metal end caps at opposite ends of said housing,

b. a first contact generally radially centered in said insulating housing and a first conductive rod supporting said first contact and electrically connected to one of said end caps,

c. a second contact movable along the central longitudinal axis of said insulating housing between a closed position in engagement with said first contact and an open position displaced from said first contact to establish an arcing gap therebetween,

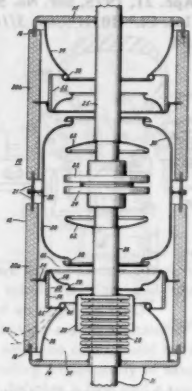
d. a second conductive contact rod supporting said second contact and electrically connected to the other of said end caps,

e. a tubular metal central shield within said housing surrounding the arcing gap, normally electrically isolated from both of said contacts, and having first and second ends at its opposite extremities,

f. a pair of tubular metal end shields respectively electrically connected to said end caps, a first one of said end shields surrounding said first contact rod and a second one of said end shields surrounding said second contact rod,

g. a pair of tubular metal intermediate shields, a first one of which is disposed between said first end shield and said central shield and a second one of which is disposed between said second end shield and said central shield,

h. said first intermediate shield normally being electrically isolated from said first end shield and said central shield, and said second intermediate shield normally being electrically isolated from said second end shield and said central shield,



i. said first intermediate shield having one end adjacent to said first end of said central shield but spaced axially of said first contact rod from said first end of said central shield, with no axial overlap between said first intermediate shield and said central shield,

j. said second intermediate shield having one end adjacent to said second end of said central shield but spaced axially of said second contact rod from said second end of said central shield, with no axial overlap between said second intermediate shield and said central shield,

k. said first intermediate shield having a second end adjacent the inner end of said first end shield and surrounding said inner end of the first end shield in radially-spaced, axially-overlapping relation thereto,

l. said second intermediate shield having a second end adjacent the inner end of said second end shield and surrounding said inner end of the second end shield in radially-spaced, axially-overlapping relation thereto.

4,006,332

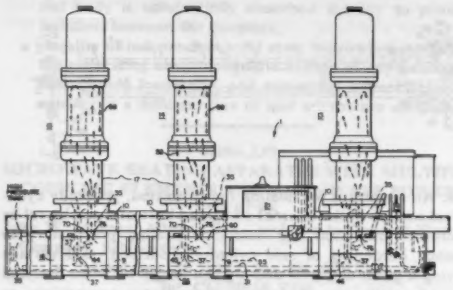
CONVECTION HEATING APPARATUS FOR MULTI-PHASE GAS-TYPE CIRCUIT INTERRUPTERS

Ronald W. Crookston, Trafford, Pa.; Thomas E. Alverson, Brookfield, Ohio, and Otto H. Soles, North Huntington, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 11, 1974, Ser. No. 522,960
Int. Cl.² H01H *33/54*, *33/70*
U.S. Cl. 200—148 E **7 Claims**

3. A multi-phase compressed-gas circuit-breaker installation comprising, in combination, a longitudinally extending high-pressure reservoir-tank having one or more baffles dis-

posed tranversely therein to define at least a pair of adjoining heating compartments, means for heating the gas disposed within said longitudinally extending high-pressure reservoir-tank, at least a pair of compressed-gas circuit-breaker modules extending upwardly from said high-pressure reservoir-tank, high-temperature and low-temperature pipes extending from said reservoir-tank upwardly into each respective circuit-



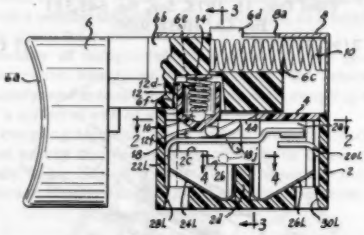
breaker module, the high-temperature and low-temperature pipes terminating at unequal levels within the high-pressure reservoir-tank with the low-temperature pipe extending farther downwardly into the lower portion of the high-pressure reservoir-tank than the high-temperature pipe, the latter terminating at an upper elevational level for encouraging the initial circulation of gas within the heating compartment and upwardly into the circuit-breaker module.

4,006,333

HIGHER RATED DOUBLE-POLE TRIGGER SWITCH

Harold W. Hults, New Berlin, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed June 11, 1975, Ser. No. 586,059
Int. Cl.² H01H 9/06
U.S. Cl. 200—157 **12 Claims**



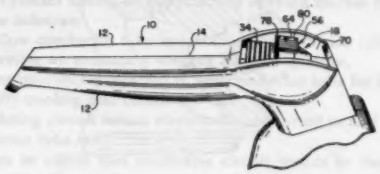
1. An electric switch comprising: an insulating housing;
stationary contact means mounted in said housing;
flexible contact means mounted in said housing for engaging said stationary contact means;
a resiliently biased switch operator mounted for movement in said housing;
a resiliently biased plunger rockable with respect to and arranged for movement by said switch operator; and
rockable contact actuator means having camming surfaces arranged for engagement by said plunger and rocking surfaces arranged for engaging said flexible contact means.

4,006,334

SAFETY SWITCH FOR POWER TOOL

William Frederick Robotham, St. Charles, and Larry D. Annis, Elgin, both of Ill., assignors to McGraw-Edison Company, Elgin, Ill.

Filed Mar. 17, 1975, Ser. No. 558,634
Int. Cl.² H01H 3/20
U.S. Cl. 200—157 **4 Claims**



1. A safety switch device for use in a portable electric tool housing defining a hollow enclosure with an opening thereto, the combination comprising a slide element received in the housing enclosure and being exposed through the housing opening, a latch carried by the slide element for exposure outside the enclosure and for manual manipulation and means supporting the latch for movement relative to the slide element along a first direction between two operative positions, means to guide the slide element for movement relative to the housing in a second direction generally at right angles to the first mentioned direction between a retracted position and an intermediate position and then to guide the slide element for movement relative to the housing in a third direction generally normal to both the first and second mentioned directions to a depressed position, and on/off electrical switch and means in the housing for holding the switch within the enclosure, said switch having an actuator which in one position is indicative of a power off condition and in a second position is indicative of a power on condition and wherein the actuator is movable between the two positions, the slide element having a shoulder that is closely disposed to and overlaps the switch actuator when the slide element is in the intermediate position thereof and that engages and moves the switch actuator from the off position to the on position upon movement of the slide element to the depressed position, a spring normally biasing the slide element to the retracted position, a spring normally biasing the latch to one of said operative positions and said housing having a recess suited for receiving said latch in the one operative position when said slide element is in the retracted position, and the housing having a shoulder against which the latch in the one operative position abuts when the slide element is in the retracted position operable to preclude slide element movement therefrom without first manually shifting the latch from the one operative position to its other operative position.

4,006,335

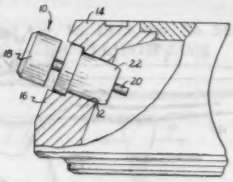
PUSH-BUTTON SWITCH

Carlton E. Sanford, East Providence, R.I., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 3, 1975, Ser. No. 554,386
Int. Cl.² H01H 3/12
U.S. Cl. 200—159 B **6 Claims**

1. A push-button electrical switch comprising an electrically conductive body having an open-ended chamber formed at one end of the body and having a passage communicating with the chamber from the opposite end of the body, a fixed electrically conductive contact, electrically insulating spacer means secured in sealing relation to the body and to the fixed contact at the open end of the body chamber supporting the fixed contact extending from the body chamber through the open chamber end in electrically insulated relation to the body, spring contact means on said spacer means within the body

chamber having the perimeter of the spring contact means in electrical engagement with the body and having a central portion of the spring contact means normally disposed in selected spaced relation to the fixed contact, an elastomer diaphragm secured between the spring contact means and the body passage sealing the body chamber opposite from the



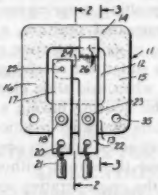
open end of the chamber, and an operating member slidable in the body passage and extending from the opposite end of the body to be manually moved for selectively pressing the diaphragm to move the central portion of the spring contact means into electrical engagement with the fixed contact to close an electrical circuit between the fixed contact and the electrically conductive body.

4,006,336

NORMALLY CLOSED WAFER THIN SWITCH

Robert E. Boyden, Bethel Island, Calif., assignor to Fred N. Schwend, Arcadia, Calif., a part interest

Filed June 2, 1975, Ser. No. 582,751
Int. Cl.² H01H 1/24
U.S. Cl. 200—246 **5 Claims**



1. A normally closed switch comprising
a thin flat base plate of insulating material,
said base plate having an opening therethrough and a peripheral portion surrounding said opening,
a first elongate leaf spring contact,
means securing said contact to the upper surface of said peripheral portion,
a free end of said contact being aligned with said opening,
a second elongate leaf spring contact,
means securing said second contact to the upper surface of said peripheral portion,
a free end of said second contact having a contact portion aligned with said opening and extending under said first contact and normally in engagement therewith,
said free end of said second contact extending above the level of said upper surface of said base plate whereby to depress said contact portion into said opening to break said engagement when said free end of said second contact is depressed.

4,006,337

APPARATUS AND METHOD FOR HEATING A GUN BARREL BORE

John H. Maxim, North Olmsted, Ohio, assignor to Park-Ohio Industries, Inc., Cleveland, Ohio

Filed Feb. 9, 1976, Ser. No. 656,354
Int. Cl.² H05B 5/08
U.S. Cl. 219—8.5 **13 Claims**

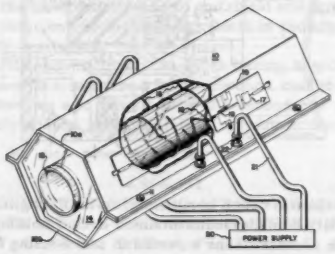
1. An apparatus for heating the elongated, generally cylindrical surface of the internal elongated bore of a gun barrel by combined induction and resistance heating preparatory to quench hardening of said cylindrical surface, said surface having a given diameter and a given length between first and second axially spaced ends, said apparatus comprising: an elongated, generally cylindrical inductor having first and second ends and an outer surface with a selected diameter only slightly smaller than said given diameter and a selected axial length at least as great as said given axial length; a first electrical connector means for electrically connecting said first end of said inductor with the first end of said cylindrical surface of said gun barrel; a second electrical connector means for electrically connecting said second end of said inductor with the second end of said cylindrical surface of said gun barrel; means for centering said outer surface of said inductor within said cylindrical surface of said gun barrrel; and one of said electrical connecting means including an electrical circuit between said barrel and said inductor, which electrical circuit includes means for creating a high frequency alternating current flow in a path including said inductor and said gun barrel in electrical series whereby combined induction and resistance heating of said gun barrel is concentrated adjacent said cylindrical surface of said bore.

4,006,338

MICROWAVE HEATING APPARATUS WITH IMPROVED MULTIPLE COUPLERS AND SOLID STATE POWER SOURCE

Rudolph A. Dehn, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,511
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 F **17 Claims**



1. A microwave heating apparatus comprising
an electrically conductive tubular housing having transverse physical dimensions such that the tubular housing is cut off at a selected microwave frequency and does not propagate electromagnetic energy,
a dielectric support member mounted centrally within said tubular housing and defining a body receiving space for a material body to be heated,

a plurality of electrically conductive, wire-like resonant energy couplers supported within said tubular housing each at least partially adjacent said dielectric support member, said couplers being spaced longitudinally and adjacent couplers being angularly staggered relative to one another in a predetermined arrangement whereby the electric fields from adjacent couplers are at least orthogonal and energy coupled to different regions of the material body is substantially absorbed thereby to provide isolation between the couplers,

a plurality of independent solid state microwave oscillators for generating electromagnetic energy at approximately the selected frequency, and means for connecting each coupler to a different one of said microwave oscillators.

4,006,339

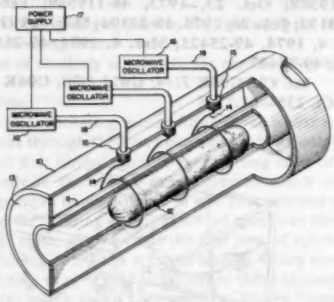
MICROWAVE HEATING APPARATUS WITH MULTIPLE COUPLING ELEMENTS AND MICROWAVE POWER SOURCES

John W. Maurer, Albany, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,795

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 F **14 Claims**



1. A microwave heating apparatus comprising

an electrically conductive enclosure tube having transverse physical dimensions such that the enclosure tube is cut off at a selected microwave frequency and does not propagate energy,

a plurality of electrically conductive energy coupling elements mounted within said enclosure tube each with at least a portion thereof in close proximity to a body receiving space for a material body to be heated,

a plurality of independent power sources for generating microwave energy at approximately the selected frequency, and means for connecting each coupling element to a different one of said power sources,

said coupling elements being spaced from one another so that energy coupled to different regions of the material body being heated is substantially absorbed thereby to provide isolation between the coupling elements.

4,006,340

DEVICE FOR THE RAPID DEPOSITING OF OXIDES IN THIN LAYERS WHICH ADHERE WELL TO PLASTIC SUPPORTS

Guy Gorinas, Annecy, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Sept. 20, 1974, Ser. No. 507,845

Claims priority, application France, Sept. 28, 1973, 73.34821

Int. Cl.² B23K 5/00

U.S. Cl. 219—121 P **2 Claims**

1. In a device for the rapid depositing of thin even and adhesive layers of oxides on plastic substrates, said device comprising:

an enclosure,

a pumping unit for providing a high vacuum to said enclosure,

a source cavity cylinder internally lined with a layer of oxide to be deposited,

a gas injection tube passing through the bottom of said cylinder,

and means for subjecting said tube to gas under pressure,

said cylinder having an axial circular opening therein facing the substrate,

a hollow conductor tube in juxtaposition with said cylinder forming an excitation winding for said cylinder,

means operably connected to said conductor tube for internally cooling said conductor tube;

oscillating circuit means electrically connected to said conductor tube, and

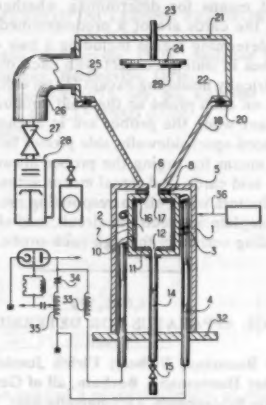
means to adjust said oscillating circuit means to thereby create a plasma arc;

a plastic substrate;

substrate support means disposed along the longitudinal axis of said axial circular opening in said cylinder, with said substrate support means supporting said substrate within said enclosure and facing said circular opening;

the improvement wherein:

said enclosure comprises a first cylindrical part closely



surrounding the source cavity cylinder and being concentric thereto,

a truncated cone shaped element having the same axis of symmetry as the circular opening of the source cavity cylinder with the axial cross section defining an opening of 60° fixed to said cylindrical part and extending axially from said first part at said opening towards said substrate,

a large diameter cylindrical element connected to the truncated cone shaped element remote from said opening, the diameter of said large diameter cylindrical element being equal to that of said truncated cone shaped element at its base and being connected thereto,

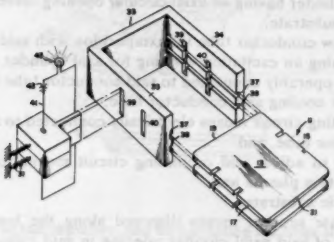
means for stabilizing said arc;

and wherein the substrate support means fixes said substrate at a distance from the axial circular opening of the source cavity which is greater than four times the diameter of said source cavity and the diameter of the axial circular opening of the source cavity, the diameter of the cavity cylinder, said pumping unit applies vacuum pressure to the enclosure, and said means for subjecting said gas injection tube to gas under pressure applies positive gas pressure to the source cavity, such that the pressure differential between the source cavity and the enclosure under vacuum pressure is on the order of 10 to facilitate deposition of oxide on said substrate at a very high speed without compromising uniformity of oxide deposition.

4,006,341
CARD COMPARING APPARATUS

Alan M. Rubin, Aldan, Pa., assignor to John P. Glass, Essington, Pa.

Filed Aug. 27, 1971, Ser. No. 175,617
Int. Cl.² G06K 7/04, 19/04; B07C 3/10; G09F 3/02
U.S. Cl. 235—61.7 R 4 Claims

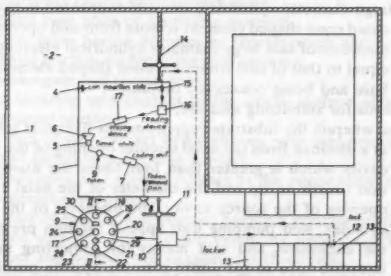


1. Card comparing apparatus comprising means for receiving a first and a second card in parallel spaced relationship, each of said cards having a predetermined number of notches along at least one of its edges, said notches being varied as to depth, and means for determining whether corresponding notches in the cards are of a predetermined depth relationship, said determing means including a pair of vertically disposed probes in sliding contact with each other, said probes being electrically insulating except for an electrical conductor positioned on each probe so that said conductors make electrical contact when the probes are in alignment, a series of slots in spaced-apart sidewalls, side probes being positioned in said slots, means for urging the probes inwardly to enter the notches in said cards, and signal means actuated by said electrical conductors when all corresponding probes are in alignment to complete an electrical circuit, said electrical conductors extending vertically through each probe.

4,006,342
CONTROL APPARATUS FOR DETERMINING USAGE TIME

Alexander Baumann, Velbert; Ulrich Juesten, Heiligenhaus, and Dieter Hannemann, Bochum, all of Germany, assignors to Schulte-Schlagbaum Aktiengesellschaft, Tonisheide, Germany

Filed Sept. 17, 1974, Ser. No. 506,893
Claims priority, application Germany, Sept. 17, 1973, 2346728; May 24, 1974, 2425143
Int. Cl.² G06K 7/08, 19/06; G07F 1/06
U.S. Cl. 235—61.11 D 7 Claims



1. A control apparatus comprising an information carrier and coding and read-out means for said information carrier, said means comprising a magnetic head, said information carrier being a token having two broad sides and in contactless juxtaposition with said magnetic head rotating about an axis transverse to said broad sides, said apparatus being additionally formed with an insertion slot for causing said token to fall along a predetermined trajectory and further comprising:

a support for said token normally in the path of said trajectory and steerable out of said path, said token being formed with a central opening;

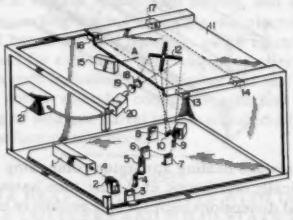
a rotatable token abutment disposed beyond said slot; and

a plunger having a cone-shaped end slidable towards said token abutment, said opening being penetrable by said cone-shaped end.

4,006,343
CODE READ-OUT MEANS

Yoshiteru Izura; Masaaki Tanaka, both of Toyonaka, and Seishi Sasaki, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 21, 1974, Ser. No. 516,679
Claims priority, application Japan, Oct. 23, 1973, 48-119588; Oct. 23, 1973, 48-119589; Feb. 26, 1974, 49-23193; Feb. 26, 1974, 49-23194; Mar. 4, 1974, 49-25420; Mar. 4, 1974, 49-25425; Mar. 4, 1974, 49-25433; Mar. 4, 1974, 49-25437
Int. Cl.² G06K 7/14; G01J 1/20; G06K 9/13
U.S. Cl. 235—61.11 E 6 Claims



1. Code read-out apparatus for reading out a code on a medium attached to an object comprising:

a laser beam source,

a plurality of reflecting mirrors each being separately rotatably mounted,

a power source for rotating said mirrors,

a plurality of sequentially interlocked gears interposed between said power source and said mirrors, the beam from said laser beam source impinging on said reflecting mirrors to generate a plurality of scanning laser beams,

a stage, said object being mounted on said stage and movable with respect thereto, said stage being slanted with respect to the horizontal so that the end thereof toward which said object moves is lower than the end at which said object enters said stage, said stage having a plurality of crossed slits therein through which said scanning laser beams may impinge upon said medium,

read-out means for receiving light reflected from said medium as a result of the scanning of said medium by said scanning laser beams,

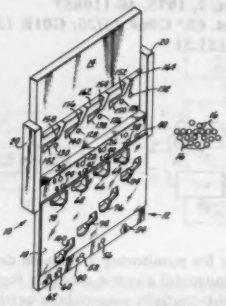
detection means for detecting when said object is at a position on said stage where it may be illuminated by said scanning laser beams, and

interrupting means controlled by the output of said detection means, said interrupting means cutting off said laser beams when said object is not located at a position on said stage where it may be illuminated by said scanning laser beams.

4,006,344
MECHANICAL BINARY NUMBER ADDING AND SUBTRACTING APPARATUS

George F. Schutte, 2823 Blakeman Ave., Rowland Heights, Calif. 91745

Filed Feb. 17, 1976, Ser. No. 658,244
Int. Cl.² G06C 27/00
U.S. Cl. 235—68 21 Claims



1. A mechanical binary apparatus for operating on binary numbers, which comprises:

a. a number of similarly sized balls for representing binary "ones",

b. a first plate,

said first plate including means for defining a first row of apertures through the first plate and enabling entry of a selected first binary number by inserting ones of said balls only in those first row apertures which are to correspond to binary "ones" of said first selected number and for defining a second row of apertures through the first plate, spaced from the first row of apertures, and enabling entry of a selected second binary number by inserting ones of said balls only in those second row apertures which are to correspond to binary "ones" of said second selected number and also for defining a third row of apertures through the first plate and spaced from the first and second rows of apertures for receiving balls from said first and second rows of apertures to indicate the binary sum of the two selected numbers,

c. a second plate cooperating with the first plate, and

d. means associated with the first and second plate for conducting at least some of the balls inserted into the first and second rows of apertures from said first and second rows to the third row of apertures in a manner causing the arrangement of conducted balls received by said third row to indicate those binary "ones" which represent the "ones" portion of the binary sum of said first and second selected binary numbers, said binary sum being thereby indicated by said third row,

said conducting means being responsive only to generally vertical movement of the first plate relative to the second plate after said plates are brought into sliding engagement in a predetermined manner.

4,006,345
SCHEDULING TOOL

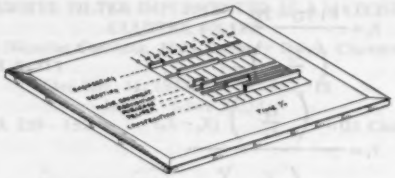
R. W. Bengtson, Succasunna, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Mar. 27, 1975, Ser. No. 562,606
Int. Cl.² G06C 27/00; G09B 19/18
U.S. Cl. 235—69 1 Claim

1. A scheduling tool for establishing the estimated duration and the performance of a contract which includes several phases comprising:

a flat plate having a rectangular area;

a plurality of parallel bars extending upward from said plate each of said bars representing a particular phase of said contract, and extending over a length which is the portion of the length of said rectangular area corresponding to the percentage of the total time of performance of the contract which is necessary to complete the phase represented by the bar;

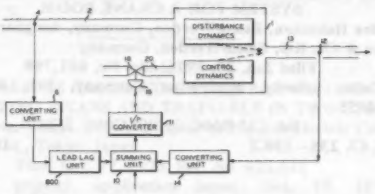


a plurality of overlay cards each having a plurality of slots which will permit said cards to be laid over said plate with said bars extending upward through said slots, said cards being calibrated so that each represents a contract of a different duration and the ends of said bars will show the beginning and ending time of each of said phases.

4,006,346
CONTROL METHOD INCLUDING FEEDFORWARD SIGNAL

Troy J. Pemberton, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 13, 1975, Ser. No. 631,580
Int. Cl.² G05D 07/06
U.S. Cl. 235—150.1 5 Claims



1. A method to control a process wherein at least one parameter of the process is influences by a disturbance variable and by a manipulated variable which control method comprises:

a. automatically measuring said disturbance variable,

b. automatically generating a disturbance signal ds as a function of time corresponding to said disturbance variable as measured,

c. converting said disturbance signal ds in a computer into a feedforward signal cs which is related to the disturbance signal ds by the control equation

$$cs = \frac{K_1}{K_2} \cdot \frac{T_3 \cdot L + 1}{T_1 \cdot L + 1} \cdot e^{-(D_d - D_c) \cdot L} \cdot ds$$

wherein K_1 is the steady state gain of the process parameter caused by the unit change of the disturbance variable, K_2 is the steady state gain of process parameter caused by the unit change of the control variable, D_d is the dead time of the disturbance dynamics, D_c is the dead time of the control dynamics, L is the laplace transform operator, T_1 and T_2 are defined by the following relation with T_c and T_d:

$$\text{if } T_d > T_c, \qquad 1)$$

$$T_2 = 0.4T_d.$$

-continued

$$T_1 = 0.47 T_d \left(\frac{T_c}{T_d} \right)^4,$$

if $T_c > T_d$, 2)

$$T_2 = \frac{1.1 (T_c - T_d)}{\left(\frac{T_c}{T_d} \right)^4 - 1}$$

$$T_1 = \frac{1.1 \left(\frac{T_c}{T_d} \right)^4 (T_c - T_d)}{\left(\frac{T_c}{T_d} \right)^4 - 1}$$

if $T_c = T_d$, 3)

$$T_1 = T_2 = T_c = T_d$$

wherein T_c is the time constant of the control dynamics and T_d is the time constant of the disturbance dynamics, with the further provision that either $T_c = t_d$ or $D_d = d_c$;

d. automatically converting said feedforward signal cs into a corresponding control signal, and

e. utilizing said control signal to adjust said manipulated variable.

4,006,347

SYSTEM FOR A CRANE BOOM

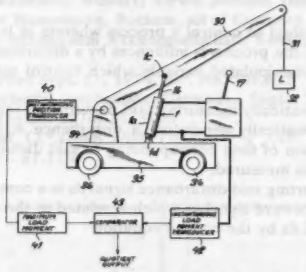
Walter Hohmann, Essen-Werden, Germany, assignor to Kruger & Co. KG, Essen-Werden, Germany

Filed Jan. 23, 1976, Ser. No. 651,788

Claims priority, application Germany, Feb. 4, 1975, 2504455

Int. Cl.² B66C *23/90*; G06G *7/70*

U.S. Cl. 235—150.2 **10 Claims**



1. In a drive for a crane having a boom, a manually actuatable unit controlling the displacement of said boom, a drive unit controlled by said manually actuatable unit for displacing said boom, and a monitoring unit for measuring the load moment on said boom, the improvement which comprises a logic element in said drive unit for controlling the speed of said boom, said monitoring unit comprising means for generating an output signal representing the quotient of the instantaneous load moment of said boom and the maximum permissible load moment for the instantaneous position thereof, and means for applying said output signal to said logic element for controlling the speed of said boom upon operation of said manually actuatable unit to reduce said speed upon increasein the amplitude of said quotient.

4,006,348

APPARATUS FOR MONITORING TWO ELECTRIC QUANTITIES BY COMBINING THREE CONSECUTIVE SAMPLES OF EACH QUANTITY

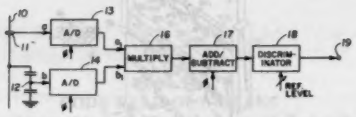
Tomoyoshi Ochiai; Takeshi Hayashi, and Mituhiro Furuse, all of Tokyo, Japan, assignors to Tokyo Denryoku Kabushiki Kaisha and Kabushiki Kaisha Meidensha, both of Tokyo, Japan

Filed Sept. 23, 1974, Ser. No. 508,629

Claims priority, application Japan, Oct. 1, 1973, 48-110856; Oct. 1, 1973, 48-110857

Int. Cl.² G06F *15/20*; G01R *13/02*

U.S. Cl. 235—151.31 **13 Claims**



1. Apparatus for monitoring a variable derived from a first substantially sinusoidal electric quantity having a first period and a second substantially sinusoidal electric quantity having a second period nominally substantially equal to said first period, said variable being independent of time, comprising:

a source of sampling pulses of a predetermined sampling period;

two samplers responsive to said sampling pulses and respectively responsive to said first and second electric quantities for respectively deriving first and second discrete signals from said first and second electric quantities at individual sampling points defined by said sampling pulses, said first and second discrete signals being representative of samples of said first and second electric quantities, respectively;

a multiplier unit coupled to said samplers for retaining a constant predetermined by said first and sampling periods and for calculating a first product of the samples represented by each pair of said discrete signals to produce a first product signal representative of said first product and a second product of said first product and said constant to produce a second product signal representative of said second product, one and the other of said pair being derived from said first and second electric signals, respectively;

an add-subtract unit coupled to the output of said multiplier unit for holding the first and second product signals and for carrying out in response to said sampling pulses an algebraic addition of the first and second product signals produced by said multiplier unit in response to the discrete signals derived at three consecutive ones of said sampling points to produce a first result signal representative of said variable, said variable being further independent of phase relations between said sampling pulses and respective ones of said electric quantities; and

a discriminator circuit coupled to said add-subtract unit and responsive to said first result signal for producing a second result signal when said variable exceeds a given reference value.

4,006,349

MONITORING APPARATUS FOR A PNEUMATIC CONVEYOR SYSTEM

Mark William Royston, La Mirada, Calif., assignor to Pacific Pneumatics, Inc., Santa Fe Springs, Calif.

Filed Oct. 23, 1975, Ser. No. 625,266

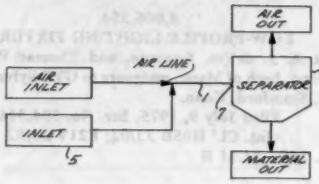
Int. Cl.² G01N *15/06*; G06F *15/20*

U.S. Cl. 235—151.34 **5 Claims**

1. A system for measuring the flow of solids in a pneumatic conveying system having a conduit with an air inlet, a solids inlet, and a mixture outlet, the measuring system comprising:

transducer means coupled to the conduit for responding to a pneumatic pressure developed therein to produce a pressure-representing signal;

means for sequentially sampling the pressure-representing signal to provide at different times a reference-value-representing signal and an operating-value-representing signal, the sampling means providing the reference-value-representing signal when only air flows through the conduit, and providing the operating-value-representing signal at a time when both air and solids flow through the conduit;



storage means for holding the reference-value-representing signal, the storage means providing the reference-value-representing signal it holds at the same time that the sampling means provides the operating-value-representing signal; and

signal responsive means for determining the mass flow of solids on the basis of a linear function defined by first and second terms, the first term being proportional to the difference between the operating value and the reference value, and the second term being the reciprocal of the reference value.

4,006,350

METHOD FOR PERFORMING A SEPARATING ANALYSIS

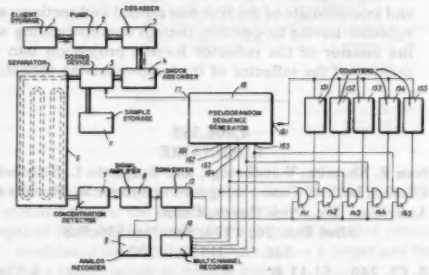
Jan Jokl, Prague, Czechoslovakia, assignor to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Apr. 3, 1975, Ser. No. 564,675

Claims priority, application Czechoslovakia, Apr. 4, 1974, 2422/74

Int. Cl.² B01D *15/08*

U.S. Cl. 235—151.35 **11 Claims**



8. Apparatus for performing a separation analysis, comprising a separating column, a dosing device for dosing the sample to be analyzed connected to its inlet, a generator of pseudo-random sequences of orders for the dosing device, a detector connected to the output of the separating column, an amplifier, an analog-digital converter, a number of gates and counters, the control inlet of the dosing device connected with the first output of the generator of pseudorandom sequences of order, the output of the detector connected to the input of the amplifier, the output of which is connected with the input of the analog-digital converter, the output of which is connected with inputs of electronic gates, the control inputs of which are connected with second outputs of the generator of pseudorandom sequences of orders, the outputs of the gates connected with inputs of counters.

4,006,351

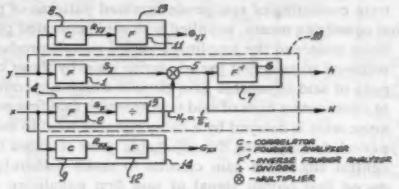
RECURSIVE FILTER IMPLEMENTED AS A MATCHED CLUTTER FILTER

James Nickolas Constant, 1603 Danbury Drive, Claremont, Calif. 91711

Filed Nov. 11, 1974, Ser. No. 522,718

Int. Cl.² G06F *15/34*

U.S. Cl. 235—152 **21 Claims**



1. In a recursive (zeros and poles) filter implemented as a matched clutter filter having input signals y and x, the improvements comprising:

first means having input signal x and providing at its output a signal representing the transfer function H_r of said recursive filter; and

second means having input the signal y and signal H_r from said first means and providing at its output at least one of the convolution signal $y_0 = y * h_r$ and its frequency spectrum S_y

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4,006,352

EQUALIZER COMPRISING FIRST AND SECOND EQUALIZING MEANS AND TRAINABLE IN TWO STEPS

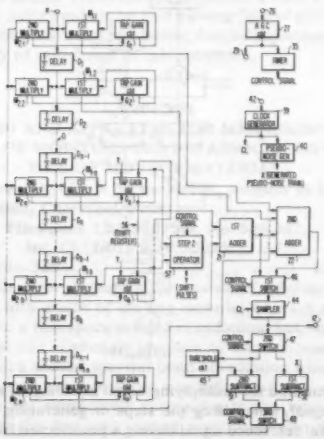
Yoichi Sato, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,221

Claims priority, application Japan, Oct. 18, 1974, 49-119402

Int. Cl.² H03K *5/153*; G06G *7/625*

U.S. Cl. 235—152 **15 Claims**



1. An equalizer, supplied with signals produced in a trans-

mitter at a predetermined clock interval, for producing an equalized signal, said supplied signals including a first and a second pseudo-noise train successively produced in said transmitter, said first pseudo-noise train consisting of a series of partial trains, each of said partial trains having a first period and a predetermined pattern of pulses, said second pseudo-noise train having a second period longer than said first period, which comprises:

a delay line having a plurality of taps for delaying said supplied signals by a total equal at least to said first period to produce delayed signals from the respective taps;

a series of adjustable gain circuits connected to the respective taps and retaining adjustable gains for giving the adjustable gains to said delayed signals, respectively, to produce amplitude-varied signals;

a noise generator for producing a generated pseudo-noise train consisting of said predetermined patterns of pulses;

first equalizing means, supplied with said generated pseudo-noise train and the amplitude-varied signals produced in response to said first pseudo-noise train by those central ones of said adjustable gain circuits which are connected to consecutive ones of said taps at which said first pseudo-noise train is delayed by a delay equal in total to said first period, for adjusting the adjustable gains retained by said central adjustable gain circuits to make a thereby produced first output signal of said first equalizing means simulate said generated pseudo-noise train;

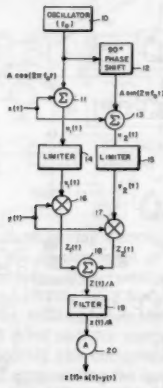
cyclic permutation means for subjecting said adjusted gains to cyclic permutation in said central adjustable gain circuits to make those of said central adjustable gain circuits which are placed at a center portion of the series of said central adjustable gain circuits retain larger ones, in absolute values, of said adjusted gains; and

second equalizing means supplied with the amplitude-varied signals produced in response to said second pseudo-noise train by all of said adjustable gain cicuits for self-adaptively adjusting the adjustable gains retained by said all adjustable gain circuits to make a thereby produced second output signal of said second equalizing means become said equalized signal.

4,006,353
SIGNAL MULTIPLIER DEVICES

John N. Pierce, Lexington, Mass., assignor to Signatron, Inc., Lexington, Mass.

Filed Nov. 21, 1975, Ser. No. 634,051
Int. Cl.² G06G 7/16
U.S. Cl. 235—194 **25 Claims**



1. A method for multiplying a first input signal and a second input signal, comprising the steps of generating at least one sinusoidal reference signal having a preselected frequency and a substantially constant amplitude greater than the maximum amplitude of said first input signal;

combining by addition said at least one reference signal and said first input signal to produce at least one intermediate signal;

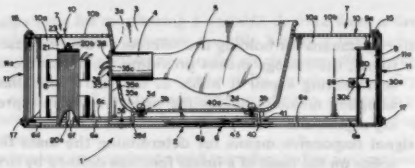
limiting the amplitude of said at least one intermediate signal to a predetermined level and combining by multiplication said at least one limited amplitude signal and said second input signal to produce an unfiltered signal, and

filtering said unfiltered signal to produce a filtered signal proportional to the product of said first imput signal and said second input signal.

4,006,354
LOW-PROFILE LIGHTING FIXTURE

Hendrik A. J. deVos, Swansea, and Thomas W. Carvalho, Somerset, both of Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 9, 1975, Ser. No. 594,316
Int. Cl.² H05B 33/02; F21V 23/02
U.S. Cl. 240—51.11 R **16 Claims**



1. A low-profile lighting fixture comprising:

a generally-flat base member having a first end and a second end;

a first end section attached to the base member at the first end thereof and defining a first housing;

a power supply ballast transformer contained within the first housing defined by the first end section;

a second end section attached to the base member at the second end thereof and defining a second housing;

a power supply capacitor contained within the second housing defined by the second end section;

a lamp-receiving socket;

mounting means attached to the base member adjacent to one of the end sections and positioning the lamp-receiving socket in a generally horizontal orientation; and

a reflector mounted to the base member in a common horizontal plane with the first and second end sections and intermediate to the first and second end sections, said reflector having an opening therein communicating with the interior of the reflector for the projection into the interior of the reflector of the lamp-receiving socket.

4,006,355
LUMINAIRE

Sylvan R. Shemitz, Woodbridge, and Benjamin L. Stahlheber, Clinton, both of Conn., assignors to Sylvan R. Shemitz and Associates, Inc., New Haven, Conn.

Filed Dec. 26, 1974, Ser. No. 536,588
Int. Cl.² H05B 33/02
U.S. Cl. 240—51.11 R **6 Claims**

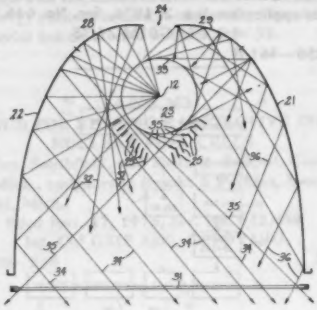
1. In a luminaire, the combination of:

a light source in an envelope;

parabolic reflecting surfaces disposed on at least two opposite sides of said light source so that their focal points substantially coincide, said light source being positioned approximately at said coincident focal points and portions of said reflecting surfaces being so positioned that reflections therefrom cross and provide maximum candlepower in the zones of about 25° to about 45° above nadir; and

a plurality of light absorbing surfaces positioned between

said reflecting surfaces, close to said envelope and generally radially of said light source so as to cut off substantially all light emanating near tangentially from said envelope which would otherwise have reflected into the zones of about 45° to about 90° above nadir;



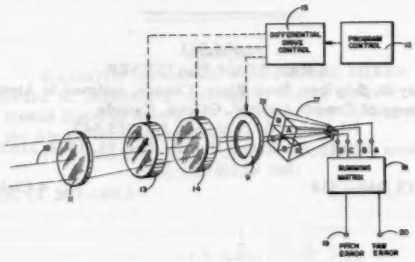
whereby veiling reflections are substantially eliminated in the zones about 0° to about 25° above nadir and direct glare is eliminated in the zones above about 45° above nadir.

4,006,356

RADIANT ENERGY TRACKING DEVICE

Jack L. Johnson, Corona del Mar, and Reno U. Pierotti, Costa Mesa, both of Calif., assignors to Aeronutronic Ford Corporation, Blue Bell, Pa.

Filed Oct. 27, 1961, Ser. No. 148,092
Int. Cl.² G01J *1/20*; F41G *7/00*
U.S. Cl. 250—203 R **5 Claims**



1. In a radiant energy tracking device sensitive to radiation of scanned targets the combination of;

optical focusing means having an optical axis for receiving modulated signal pulses reflected from a target and forming a target image at a focal point,

means for nutating said image in the focal plane about said optical axis,

detector means comprising four surfaces, each surface occupying a quadrant in the circle encompassed by said image as it nutates about said optical axis,

said detector means providing an output pulse for each of said quadrants, the pulse width being indicative of the duration of said target image on each said surface, and

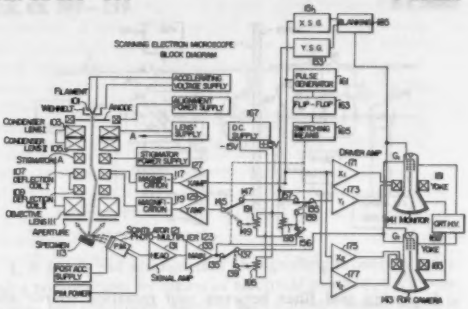
summing means responsive to said output signals for providing signals proportional to the deviation of said target from said optical axis.

4,006,357

APPARATUS FOR DISPLAYING IMAGE OF SPECIMEN

Kimio Kanda, and Tadashi Ohtaka, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed July 5, 1974, Ser. No. 485,926
Claims priority, application Japan, July 9, 1973, 48-76632
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² H01J *37/26*
U.S. Cl. 250—310 **9 Claims**



1. Apparatus for displaying an image of a speciment, comprising:

a. means for producing and accelerating an electron beam to be projected on said specimen,

b. first means for deflecting said accelerated electron beam in directions of X- and Y-axes to thereby scan a surface of said specimen,

c. means for converting information representative of states or properties of said specimen restulting from said electron beam bombardment of said specimen into corresponding electrical specimen information signals,

d. at least one cathode ray tube,

e. second means coupled with said cathode ray tube for deflecting an electron beam thereof in directions of X- and Y-axes,

f. brightness modulating means for producing an image of said specimen on a viewing face of said cathode ray tube in accordance with said electrical specimen information signals,

g. third means for producing an output in response to at least said X-axis second deflection means, and

h. fourth means responsive to said output from said third means for applying said electrical specimen information signals to said Y-axis second deflection means to thereby additionally produce on said viewing face of said cathode ray tube a wave form for aiding desired adjustments in the display of said image of said specimen.

4,006,358

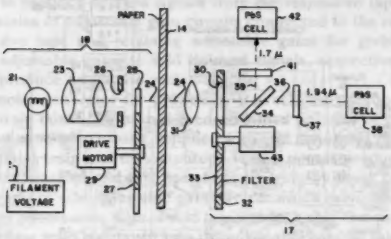
METHOD AND APPARATUS FOR MEASURING THE AMOUNT OF MOISTURE THAT IS ASSOCIATED WITH A WEB OF MOVING MATERIAL

John J. Howarth, Monte Sereno, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed June 12, 1975, Ser. No. 586,347
Int. Cl.² G01J *3/34*; G01N *21/34*
U.S. Cl. 250—339 **11 Claims**

1. A method for measuring the amount of substance that is associated with a web of moving material where a radiation source emits a first spectral band of radiation that impings on the material and is strongly sensitive to the substance in the material and a second spectral band of radiation which is less sensitive to said substance, and where first and second detection means are respectively responsive to the intensities of radiation of the first and second spectral bands which are reflected from or transmitted through the material, the method comprising the following steps:

a. providing at least one sample of said material with a known amount of said substance;
b. placing said sample between said radiation source and detectors and measuring the ratio of the radiation received by the first and second detector means;
c. providing a filter which simulates a predetermined amount of substance the filter being spectrally similar to the frequency sensitivity of said substance to said radiation over a predetermined frequency band;



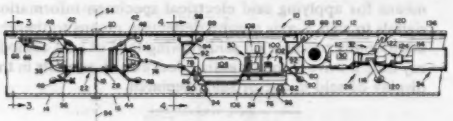
d. placing said filter between said radiation source and detectors and measuring said ratio;
e. determining the relationship between a change of sample ratios and a change of filter ratios due to placement of a successive plurality of nominal layers of a carrier containing some of said substance between said source and detectors; and
f. utilizing the relationship of step (e) to provide a corrected ratio for an unknown sheet material.

4,006,359

PIPELINE CRAWLER

James R. Sullins, Tulsa, and Robert E. West, Catoosa, both of Okla., assignors to ABS Worldwide Technical Services, Inc., New York, N.Y.

Filed Oct. 12, 1970, Ser. No. 79,859
Int. Cl.² G01N *21/00, 23/00;* B61B *13/10*
U.S. Cl. 250—358 P 13 Claims



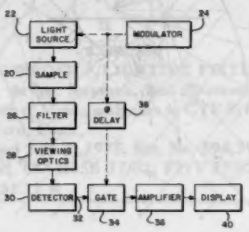
1. The combination of
a self-propelled crawler for traveling through a pipeline,
inspection means on said crawler for inspecting welds in the pipeline,
control means on said crawler for controlling the operation of the crawler and of the inspection means on the crawler, said control means being effective to sense a weld and actuate said inspection means to inspect the welds,
a first pickup on said crawler responsive to the presence of a marker on the outside of the pipeline, said pickup being coupled to the control means and effective to STOP the crawler when a marker is present, and
a second pickup on said crawler positioned in advance of the first pickup and responsive to the presence of the marker on the outside of the pipeline, said second pickup being coupled to the control means and effective to START the crawler in a forward direction when a marker is positioned thereover.

4,006,360

METHOD OF DISCRIMINATING BETWEEN DYED PARTICLES AND BACKGROUND FLUORESCENCE OF THE DYE

William A. Mueller, Dedham, Mass., assignor to Block Engineering, Inc., Cambridge, Mass.

Continuation of Ser. No. 499,132, Aug. 21, 1974, abandoned.
This application Jan. 2, 1976, Ser. No. 646,324
Int. Cl.² G01M *21/38*
U.S. Cl. 250—461 B 8 Claims



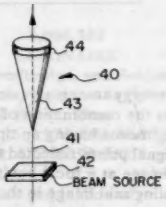
1. Method of distinguishing between two species of fluorescent particles in a mixture of said species, which species have respectively different fluorescent quantum efficiencies and corresponding decay lifetimes, but fluoresce at substantially a common wavelength band, said method comprising the steps of
substantially simultaneously irradiating said particles in said mixture with radiation capable of stimulating fluorescent emission from both said species, but not intense enough to cause bleaching;
reducing the intensity of said radiation so as to permit fluorescent emission from both of said species to decay statistically; and
measuring after a delay determined as a function of the shorter of said decay lifetimes following reduction of said radiation intensity, the intensity of said fluorescent emission at said wavelength band during a predetermined time interval.

4,006,361

X-RAY BEAM FLATTENER

Stanley O. Schriber, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 3, 1975, Ser. No. 555,047
Claims priority, application Canada, Dec. 18, 1974, 216333
Int. Cl.² H05G *3/00*
U.S. Cl. 250—510 4 Claims



1. In an X-ray apparatus having a beam source for producing a strongly forward peaked bremsstrahlung radiation beam about a central beam axis, said beam including photons with energies >1 MeV, an X-ray beam flattener comprising:
a low atomic number high density material on the central axis for preferentially attenuating low energy photons in the X-ray beam passing through said material, said material having a predetermined shape for attenuating the

radiation intensity of said beam in decreasing amounts as the angle from the central axis increases, wherein said low Z material has an atomic number $Z < 25$ and a density >3.0 gm/cm³ and is selected from the group consisting of Al_2O_3, BeO, $BeAl_2O_4$, and Sic; and

a thin layer of high Z material positioned in the forward direction with respect to said low Z material for absorbing low energy photons in said X-ray beam, wherein said high Z material has an atomic number $Z > 58$.

4,006,362

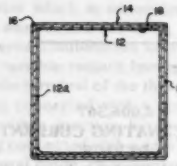
SHROUD FOR STORING RADIOACTIVE SPENT NUCLEAR FUEL CELLS

Leslie Mollon, Southfield, and Keith R. Ball, St. Clair Shores, both of Mich., assignors to Brooks & Perkins, Incorporated, Southfield, Mich.

Filed Nov. 17, 1975, Ser. No. 632,450

Int. Cl.² G21F 3/00; G21C 11/00

U.S. Cl. 250—518 **26 Claims**



1. A generally tubular shroud for storing radioactive spent nuclear fuel cells in pools, said shroud being of uniform cross-section, said shroud comprising an outer tube, an inner tube within said outer tube, said tubes forming inner and outer spaced apart side walls of said shroud, and dimensioned to provide a uniform spacing between the inner and outer side walls thereof, and neutron absorbing panel material substantially filling the spaces between the inner and outer side walls of said shroud, the side walls of said tubes being in pressure contact with the sides of said panels.

4,006,363

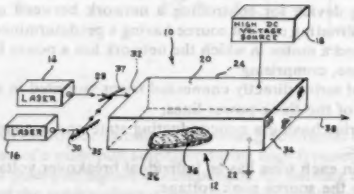
GASEOUS INFRARED WAVEGUIDE MIXER

Howard R. Schlossberg, Lexington, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,029

Int. Cl.² H03F 7/02

U.S. Cl. 307—88.3 **12 Claims**



1. An infrared gaseous waveguide mixer comprising a laser source capable of producing a laser beam, a waveguide, said waveguide being of rectangular configuration having a pair of opposed metallic walls, a pair of opposed dielectric walls and an infrared window at each end thereof, said waveguide being in optical alignment with said laser beam, a DC source electrically connected to said metallic walls and a gas contained within said waveguide whereby said waveguide mixer produces an output of extremely high power.

4,006,364

TOUCH PAD ARRANGEMENT FOR SIGNALLING ARRIVALS IN SWIMMING COMPETITIONS

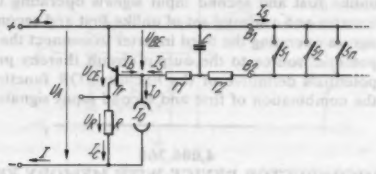
Max Suter, Dotzigen, Switzerland, assignor to Societe Suisse pour l'Industrie Horlogere Management Services, S.A., Bienne, Switzerland

Filed Sept. 30, 1975, Ser. No. 618,037

Claims priority, application Switzerland, Oct. 16, 1974, 13856/74

Int. Cl.² G08B 5/22

U.S. Cl. 307—119 **8 Claims**



1. A touch pad arrangement for signalling arrivals in swimming competitions by means of electrical contacts, each comprising two electrodes, wherein such contacts are arranged in parallel and coupled between the emitter and base of at least one associated transistor to thereby clamp a voltage across the contacts to a voltage below the decomposition voltage of the electrodes forming the contacts, said transistor being further connected in circuitry including an electric supply to amplify the voltage variation across the contact arising from the closing of a contact and at the same time to modulate the electric supply current in response to that voltage variation.

4,006,365

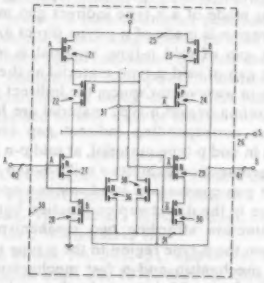
EXCLUSIVE OR INTEGRATED LOGIC CIRCUITS USING COMPLEMENTARY MOSFET TECHNOLOGY

Claude Raymond Marzin, Fishkill, N.Y.; Claude Maurice Rougeaux, Paris, and Patrice Jean Claude Vernes, Mennecy, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,487

Int. Cl.² H03K 19/08

U.S. Cl. 307—205 **8 Claims**



1. An Exclusive OR circuit comprising

a. first, second, third, and fourth MOS inverters connected in a bridge circuit,

b. first and second MOS switching means coupled to the bridge circuit, the first switching means being coupled to the first and second inverters as the first side of the bridge circuit and the second switching means being coupled to the third and fourth inverters as the second side of the bridge circuit,

c. first and second potential sources connected to different ends of the bridge circuit,

d. means forming a gate discharge path from one side of the bridge circuit through an inverter of the other side of the bridge circuit to the output circuit,

e. a first input signal coupled to the first and second inverters and to the first switching means,

f. a second input signal coupled to the second and third inverters and to the second switching means, and

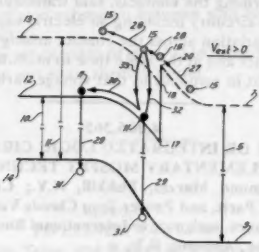
g. an output circuit coupled to the bridge circuit, a first set of like first and second input signals operating the second inverter and a second set of like first and second input signals operating the fourth inverter to connect the first potential source to the output circuit and a first set of unlike first and second input signals operating the first inverter and a second set of unlike first and second input signals operating the third inverter to connect the second potential source to the output circuit thereby providing potentials definitive of the Exclusive OR function from the combination of first and second input signals.

4,006,366

SEMICONDUCTOR DEVICE WITH MEMORY EFFECT

Iulian Basarab Petrescu-Prahova; Paul Constantin Mihailovici, and Cristian George Constantinescu, all of Bucharest, Romania, assignors to Institutul de Fizica, Bucharest, Romania

Filed May 9, 1975, Ser. No. 576,137
Claims priority, application Romania, Nov. 8, 1974, 80464
Int. Cl.² H01L *29/205*
U.S. Cl. 307—238 **43 Claims**



1. A semiconductor device with memory effect comprising: a semiconductor material body containing a p-n heterojunction between two p-type and n-type regions; the n-type region is made of a n-type indirect gap material and the p-type region is made of a p-type direct gap material; the indirect gap of said n-type material is wider than that indirect gap of said p-type material at the corresponding position in wavevector space; the indirect gap conduction band minima in said n-type material are higher in energy than the corresponding indirect gap conduction band minima in said p-type material, at said p-n heterojunction; aid heterojunction exhibits a spike-notch structure in the indirect gap conduction band minima and a spike-notch structure in the direct gap conduction band minima; said heterojunction affording two mechanisms for electron flow from the n-type region to the p-type region including a slow mechanism and a fast mechanism and effecting switching from said slow mechanism and said fast mechanism, by avalanche filling of the direct notch with direct electrons, due to the enhancement of the electron-electron interaction; said interaction occurring between indirect electrons injected over the indirect spike and said direct electrons which already exist in the direct notch; said avalanche filling being produced when a critical value of the notch electron population is exceeded; the switching from said fast mechanism to said slow mechanism being effected by emptying of said direct notch due to the attenuation of said electron-electron interaction, said emptying being produced when said notch electron population decreases below a critical value; and

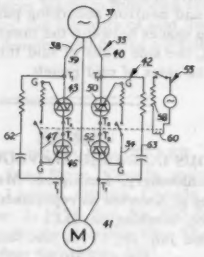
circuiting means for biasing said p-n heterojunction and coupling it with a load with a variable external voltage so that a current-voltage characteristic which exhibits two branches, the OFF branch and the ON branch, and a hysteresis loop is produced, the operating point being on said OFF branch of the current-voltage characteristic, when a critical point ON is exceeded, determined by a critical voltage level ON and by a critical level ON, the latter levels being correlated with an increase of said notch electron population over a critical value, the device switches on said ON branch of the current-voltage characteristic, the operating point being on said ON branch of the current-voltage characteristic and decreasing the bias, when a critical point OFF, determined by a critical voltage level OFF and a critical current level OFF is exceeded, the latter levels being correlated with a decrease of said notch electron population below a critical valve, the device switches on said OFF branch of the current-voltage characteristic; said hysteresis loop being defined by said two branches of the current-voltage characteristic and by two load lines which pass through said ON and OFF critical points.

4,006,367

SOLID STATE ALTERNATING CURRENT SWITCHING DEVICE

Eduard Karl Ott, Bothell, Wash., assignor to Frontier Machinery Company, Walla Walla, Wash.

Filed Nov. 13, 1974, Ser. No. 523,226
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² H03K *17/60*
U.S. Cl. 307—252 B **7 Claims**



1. A solid state alternating current three phase power switching device for controlling a network between a three phase alternating current source having a predetermined peak voltage and a motor in which the network has a power line for each phase, comprising:

pairs of series directly connected triacs mounted in at least two of the three power lines;

each triac having a nonconducting state and a conducting state;

wherein each triac has an individual breakover voltage less than the source peak voltage;

wherein the sum of the breakover voltage of the triacs exceeds the source peak voltage;

each triac having a gate terminal;

isolated circuits interconnecting the gate terminals of each pair of triacs; and

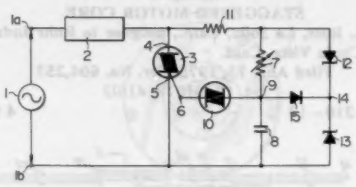
each circuit having conductive means for permitting a triac gate current to be conducted through the circuit between the gate terminals to change the pair of triacs from their nonconductive states to their conducting states to apply the source alternating current to the motor.

4,006,368

A.C. VOLTAGE REGULATOR INCLUDING BILATERAL THYRISTOR

Kazuo Ichikawa, Nagano, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,222
Claims priority, application Japan, Mar. 4, 1975, 50-26386
Int. Cl.² H03K 17/72, 17/02
U.S. Cl. 307—252 B **1 Claim**



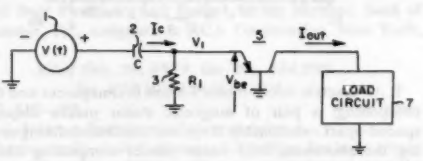
1. A phase controlled a.c. voltage regulator employing a bilateral thyristor which is connected in series with a load across an a.c. source, and including a time constant circuit formed by a series combination of a variable resistor and a capacitor, the variable resistor having its one end connected with a first anode terminal of the thyristor, and one end of the capacitor being connected with a second anode terminal of the thyristor, with a junction between the resistor and the capacitor being connected with a gate terminal of the thyristor through a bilateral diode, characterized by the provision of a resistor connected between the first anode terminal of the thyristor and the variable resistor, and a pair of constant voltage diodes connected across the series circuit formed by the variable resistor and capacitor and having their junction connected with a junction between the variable resistor and capacitor through a diode.

4,006,369

CURRENT GENERATOR INCLUDING A RATE DISCRIMINATOR

Keith Alan Taylor, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed June 9, 1975, Ser. No. 585,013
Int. Cl.² H03K 5/00; H03F 3/26
U.S. Cl. 307—261 **4 Claims**



1. An electronic circuit for providing additional current to the load of a push-pull amplifier during high-frequency operation of push-pull signals to compensate for limiting characteristics of the semiconductor devices of said amplifier, comprising:

input circuit means adapted for receiving said push-pull signals and producing an output current proportional to the rate of change thereof; and

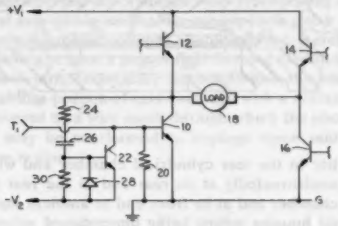
amplifier means including bias network means for passing said output current to said load, said bias network means holding said amplifier means off when said output current is less than a predetermined value and turning said amplifier means on when said output current exceeds a predetermined value.

4,006,370

FAST TURN-OFF CIRCUIT FOR POWER TRANSISTOR

Irvin Leslie Erler, Waynesboro, Va., assignor to General Electric Company, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,985
Int. Cl.² H03K 3/33, 17/60
U.S. Cl. 307—300 **2 Claims**



1. In a system for energizing a load from a voltage source having first and second terminals, the combination comprising:

a. a power transistor having an emitter, base and collector with its collector-to-emitter path connected in series with the load and between the terminals of the voltage source to provide a low impedance path for the load when a drive signal is received at said base; and

b. regenerative feedback means coupled between said collector and base of said power transistor for only feeding back to said base a signal responsive to an increasing potential sensed at said collector to reduce the time necessary to turn off said power transistor, said feedback means comprising:

i. a second transistor having an emitter, base and collector, said collector of said second transistor being electrically coupled to said base of said power transistor;

ii. transient circuit means including a series circuit combination of a resistor and a capacitor connected between said collector of said power transistor and said base of said second transistor for causing saturation of said second transistor when the voltage across the collector to emitter of said power transistor is in the process of increasing; and

iii. a diode connected directly across the base-to-emitter of said second transistor in a reverse polarity relationship to protect a base-to-emitter junction of said second transistor from being destroyed by a reverse biasing feedback signal responsive to a decreasing potential at said collector of said power transistor when said power transistor is being driven into saturation by a signal applied to said base of said power transistor.

4,006,371

ELECTROACOUSTICAL TRANSDUCER COMPRISING PIEZOELECTRIC ELEMENT

Patric C. Quirke, Whitewater, Wis., assignor to Whitewater Electronics, Inc., Whitewater, Wis.

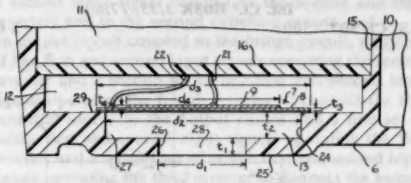
Continuation of Ser. No. 342,751, March 19, 1973. This application Mar. 20, 1975, Ser. No. 560,487
Int. Cl.² H01L 41/08
U.S. Cl. 310—8.2 **3 Claims**

1. An acoustic transducer that is substantially nondirectional and is adapted for response at substantially a predetermined frequency, said transducer being characterized by:

A. a transducer element comprising a disc of piezoelectric material intimately bonded to a concentric diaphragm; and

B. housing means to which the transducer element is bonded all around its edge and which cooperates with the transducer element to define a resonant acoustical cavity of which the transducer element comprises a rear wall, said housing means providing

1. an axially short rear cylindrical chamber concentric to the transducer element and having a diameter on the order of that of the transducer element, and
2. a smaller diameter front cylindrical chamber concentric to the rear cylindrical chamber and which opens unobstructedly at its rear end to the rear cylindrical chamber and at its front end to ambient medium; and



C. said housing means being dimensioned substantially in the relationship

$$f = \frac{cd_1}{2\pi d_2^2}\sqrt{\frac{1}{t_2 \cdot t_1 + \sqrt{\frac{d_1^2}{1.5}}}}, 2$$

where

f is said predetermined frequency in Hz,

c is the velocity of sound in the medium in which the transducer is adapted to operate,

d_1 is the diameter of the front cylindrical chamber,

d_2 is the diameter of the rear cylindrical chamber,

t_1 is the axial dimension of the front cylindrical chamber, and

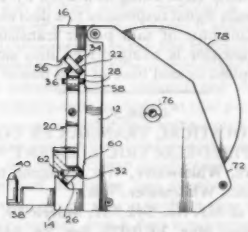
t_2 is the axial dimension of the rear cylndrical chamber.

4,006,372

TRANSDUCER POSITIONER

Leon Henry Brown, Jr., Sylmar, and David H. Peters, Santa Monica, both of Calif., assignors to Wangco Incorporated, Los Angeles, Calif.

Filed Mar. 10, 1975, Ser. No. 557,109
Int. Cl.² H02K *41/02*
U.S. Cl. 310—13 **16 Claims**



1. Positioning apparatus including:

a carriage;

a back member having a reference surface;

an upper guide member connected to said back member and having a first inwardly sloping guide surface opposite said reference surface;

a lower guide member connected to said back member and having a second inwardly sloping guide surface also opposite said reference surface;

a single upper angled guide wheel spring-mounted on said carriage at an angle thereto in engagement with said first inwardly sloping guide surface;

first and second lower angled guide wheels mounted on said carriage at an angle thereto in engagement with said second inwardly sloping guide surface;

an upper reference guide wheel carried by said carriage in engagement with said reference surface; and

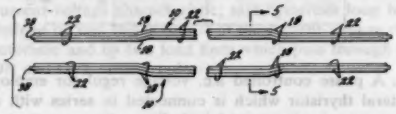
at least one lower reference guide wheel carried by said carriage in engagement with said reference surface.

4,006,373

STAGGERED MOTOR CORE

James A. Ross, La Jolla, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Aug. 13, 1975, Ser. No. 604,253
Int. Cl.² H02K *41/02*
U.S. Cl. 310—13 **4 Claims**



1. An improved core for a linear induction motor comprising:

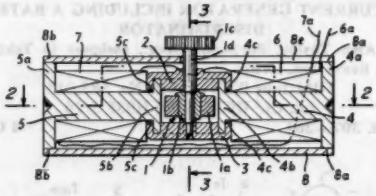
a pole piece portion having a plurality of spaced apart pole pieces along the length of said core, at least one of said plurality of pole pieces is laterally offset from an adjacent one of said plurality of pole pieces.

4,006,374

ELECTRIC MICRO MOTOR FOR A TIMEPIECE

Yasuichi Nakagawa, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Feb. 19, 1975, Ser. No. 550,929
Int. Cl.² H02K *21/12*
U.S. Cl. 310—40 MM **5 Claims**

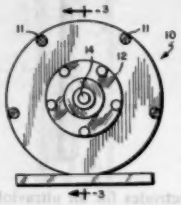


1. An electric micro motor for use in timepieces and the like comprising: a pair of magnetic stator pieces disposed in spaced-apart relationship from one another defining an opening therebetween, said stator pieces comprising elongated bodies having one concavely curved end portion and one other end portion, said elongated bodies being disposed in end-to-end relationship with their curved end portions spaced from and facing one another to define therebetween said opening; a coil winding wound on each said stator pieces; a rotor having a permanent magnet portion and being disposed in said opening with its permanent magnet portion magnetically coupled to said stator pieces with an air gap therebetween; a pair of non-magnetic coupling members connected to and coupling together said stator pieces and having means rotatably mounting said rotor in said opening; and a magnetic enclosure member connected to said other end portions of said elongated bodies and defining with said stator pieces an enclosure enclosing said stator pieces, rotor and coupling members and forming with said magnetic stator pieces a closed magnetic circuit for the micro motor.

4,006,375
STEPPING MOTOR

Frank Lyman, Jr., Cambridge, and William C. McDonald, Belmont, both of Mass., assignors to Cambridge Thermionic Corporation, Cambridge, Mass.

Continuation of Ser. No. 442,686, Feb. 14, 1974, abandoned. This application May 2, 1975, Ser. No. 573,922
Int. Cl.² H02K 37/00
U.S. Cl. 310—49 R **21 Claims**



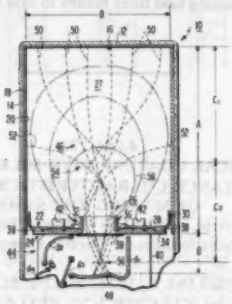
1. A multiphase rotary stepping motor comprising
housing means;
a shaft;
bearing means associated with said housing means for rotatably mounting said shaft;
a rotor secured to said shaft, said rotor having a plurality of equally spaced pole pieces extending radially therefrom;
a stator fixedly mounted to said housing means, said stator having N groups of pairs of pole pieces separated by gaps, said rotor pole pieces being rotatably movable through said gaps, each of said groups having at least one coil associated therewith so that corresponding groups of said rotor pole pieces are capable of developing flux paths with said groups of stator pole pieces upon passage of current in the coils of said stator pole piece groups;
the stator pole pieces in each of said groups thereof being angularly spaced from each other by a spacing equal to the spacing of said rotor pole pieces and said stator pole groups being separated from each other by N spacings that are not equal to the spacings of said rotor pole pieces, (N−1) of said N spacings being equal to each other and the remaining one of said N spacings being greater than that of said (N−1) spacings.

4,006,376
PHOTOTUBE HAVING IMPROVED ELECTRON COLLECTION EFFICIENCY

Richard Dale Faulkner, and Robert Edwin McHose, both of Lancaster, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 28, 1975, Ser. No. 554,099
Int. Cl.² H01J 39/04, 39/00
U.S. Cl. 313—95 **4 Claims**

1. An electron discharge tube comprising
a. a hermetically sealed evacuated envelope having a transparent faceplate portion with a transmissive photocathode on said faceplate portion having a substantially planar electron emissive surface within the interior of said envelope capable of emitting photoelectrons as an electron stream in response to radiation impinged thereon,
b. an elongated tubular portion extending from said faceplate portion;
c. electrical output means spaced from said photocathode capable of collecting said emitted electrons as an electron stream, and of providing an electrical output signal responsive to said collected electron stream, said means including an active surface collection region of an electrode upon which photoelectrons may be primarily accelerated to impinge;
d. a cylindrically shaped evacuated electron acceleration cavity between said photocathode and said active surface collection region partially enclosed by a side wall surface of the tubular portion of the envelope;
e. said side wall surface including a coating of a photocathode material capable of emitting photoelectrons in response to radiation impinged thereon, electrically connected to the photocathode;
f. an electron lens system capable of generating an electric field which includes a series of field lines of equipotential, substantially tear-drop shaped, and symmetrical about a central axis within said cavity corresponding to a central axis of propagation of said photoelectrons therein; said lens having at least a pair of field forming electrodes, one of said electrodes coaxially mounted within the interior of said tubular portion of said envelope with a central opening covered by a wire mesh through which the photoelectrons may be accelerated to impinge upon said active surface region;



one of said electrodes includes a planar major surface facing and substantially parallel with the electron emissive surface of said photocathode, with a tubular portion which extends toward the faceplate portion; and
g. said lens being capable of focussing said photoelectrons as an electron bundle to intersect in sequence at least two spaced apart regions of said cavity in which electron trajectories associated with said accelerated photoelectrons are increasingly compressed, said electron trajectories defining a region of lessening compression between said spaced apart regions of increasing compression, the final region of compression including electron trajectories of significantly greater compression than that associated with said first region of compression, said active surface collection region being located substantially along a cross-sectional plane intersecting said electron bundle along said final region of compression.

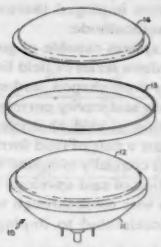
4,006,377
FILTER ATTACHMENT FOR PARABOLIC REFLECTOR LAMPS

Walter J. Kosmatka, Niles, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,287
Int. Cl.² H01K 1/26
U.S. Cl. 313—112 **6 Claims**

1. A beam projection lamp comprising:
a concave reflector having a rim about the open end thereof;
filament means within said reflector for producing light;
a lens having the periphery thereof engaging the rim of said reflector;
filter means for selective light transmission positioned on the opposite side of said lens from said reflector; and

fastening means, comprising a section of heat-shrinkable plastic tubing conforming to the peripheries of said lens



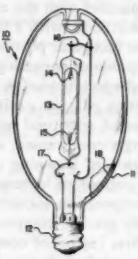
and filter means and to said rim, for mechanically attaching and sealing said filter means to said lens and reflector.

4,006,378

OPTICAL COATING WITH SELECTABLE TRANSMITTANCE CHARACTERISTICS AND METHOD OF MAKING THE SAME

Seth D. Silverstein, and Jerome S. Prener, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,671
Int. Cl.² G02B *5/20*; H01J *61/40*
U.S. Cl. 313—112 10 Claims



1. In combination with a high intensity lamp including a source of radiant energy sealed within the lamp envelope and wherein said radiant energy is characterized by visible and ultraviolet radiation, the improvement comprising:

a layer of zinc oxide disposed on at least a selected portion of the inner surface of said lamp envelope, said layer having a thickness of between 500 and 10,000 Angstroms and the operating temperature of said layer being selected to cause said layer to exhibit a sharp absorption edge at a selected wavelength, whereby selected wavelengths of said ultraviolet radiation are absorbed while selected wavelengths of said visible radiation are transmitted.

6. An optical system comprising:

a source of radiant energy including visible and ultraviolet radiation;

a substantially transmissive member interposed in the path of said radiant energy; and

a layer of zinc oxide disposed on a selected surface of said member, said layer of zinc oxide having a thickness the operating temperature of said layer being selected to cause said layer to exhibit a sharp absorption edge at a selected wavelength.

4,006,379

CARBON ELECTRODES FOR AN ULTRAVIOLET ARC LAMP FOR USE IN A LIGHT-FASTNESS TESTER

Shigeru Suga, Yoyogi 5-20-2, Shibuya, Tokyo, Japan

Filed Dec. 19, 1975, Ser. No. 642,359
Int. Cl.² H01J *1/02*, *1/14*, *1/38*, *1/48*
U.S. Cl. 313—352 2 Claims

1. Carbon electrodes for an ultraviolet arc lamp used for light-fastness testing, said electrodes comprising:

an upper electrode in the shape of an elongated cylinder about 23 mm. in diameter, the cross-section of which has an exterior annular portion consisting of a carbonaceous material and an interior core portion consisting of a mixture of a carbonaceous material and potassium sulfate, the upper electrode having dispersed therethrough potassium chloride as a stabilizing agent; and

a lower electrode in the shape of an elongated cylindrical tube about 18.5 mm. in diameter and having a hollow interior about 1–2 mm. in diameter and being of a carbonaceous material having a high electrical conductivity and having dispersed therethrough potassium chloride as a stabilizing agent;

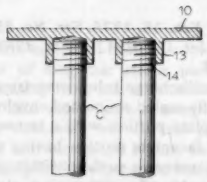
whereby when the upper and lower electrodes are placed with their ends opposed to each other and an alternating current at 135V and 16A is discharged thereacross, the discharge can be maintained stably for more than 50 hours and a stable light is continuously produced.

4,006,380

MOUNTING OF CARBON ELECTRODES ON A HOLDER OF AN ARC LAMP

Shigeru Suga, Yoyogi 5-20-2, Shibuya, Tokyo, Japan

Filed Oct. 31, 1975, Ser. No. 627,880
Int. Cl.² H01J *1/00*, *17/04*, *19/00*
U.S. Cl. 313—357 3 Claims



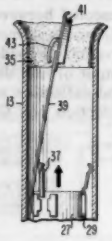
1. In combination, a plate-shaped holder for a plurality of carbon electrodes for use in an arc lamp for a weatherometer or a light fastness tester, said holder being of an electrically conductive material having a plurality of threaded portions projecting from the surface of said plate-shaped holder corresponding to the number of electrodes to be held thereon, and a plurality of carbon electrodes each having a threaded portion on one end thereof, said electrodes being mounted on said holder and electrically connected thereto solely by the threaded engagement with a corresponding threaded projection on said holder.

4,006,381

CRT WITH THERMALLY-SET GETTER SPRING

Earle Solomon Thall, Leola, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,563
Int. Cl.² H01J *31/00, 29/84*
U.S. Cl. 313—481 **5 Claims**



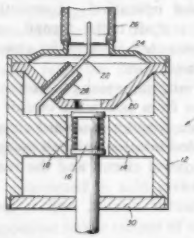
1. A cathode-ray tube comprising an envelope, an electron-gun mount assembly in said envelope, a metal spring connected at one end to said mount assembly and a getter container connected at the other end of said spring, said container being urged toward the inner wall of said envelope by said spring, at least a portion of said metal spring consisting essentially of a nitinol metal alloy which can be thermally set to a prescribed first shape whereby said spring urges said container outwardly toward the inner wall of said envelope, then cold formed to a prescribed second shape, whereby said spring does not urge said container outwardly toward the inner wall of said envelope, and then when heated above predetermined temperatures reverts to said first shape.

4,006,382

MAGNETRON FILTER

John R. Butler, Lexington, and Patricia M. Scott, Medford, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Sept. 24, 1975, Ser. No. 616,225
Int. Cl.² H01J *25/50*
U.S. Cl. 315—39.53 **4 Claims**



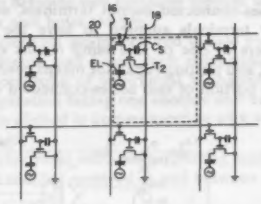
1. A magnetron comprising:
an evacuated envelope;
an anode member comprising a plurality of conductive vane members;
magnetic pole pieces positioned adjacent said anode member;
an output antenna probe member having one end attached to one of said vane members and extending through an aperture in one of said magnetic pole pieces;
a cylindrical conductive member encircling said probe member and attached to said apertured pole piece; and
the length of the section of coaxial line formed by said probe and said conductive member having an overall length of approximately one quarter of wavelength of a harmonic frequency of the frequency generated by said magnetron.

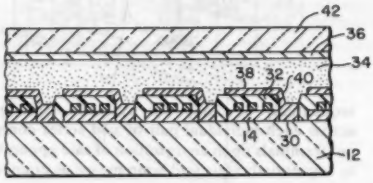
4,006,383

ELECTROLUMINESCENT DISPLAY PANEL WITH ENLARGED ACTIVE DISPLAY AREAS

Fang-Chen Luo, Turtle Creek; Thomas P. Brody, and David H. Davies, both of Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 636,281
Int. Cl.² H05B *33/02*
U.S. Cl. 315—169 TV **4 Claims**





1. An electroluminescent display panel comprising an X-Y array of display elements each of which comprises integral thin film transistor switching and control circuit elements disposed on an insulative panel substrate and interconnected by drive signal buses, and each display element including an individual electroluminescent electrode disposed on the substrate, with an electrically insulative polymerized layer over the thin film elements and the signal buses, with the electroluminescent phosphor disposed over the entire panel area in contact with the individual electroluminescent electrodes and over the insulative polymerized layer, the improvement wherein the individual electroluminescent electrodes extend from the insulative substrate and cover a substantial portion of the insulative polymerized layer.

4,006,384

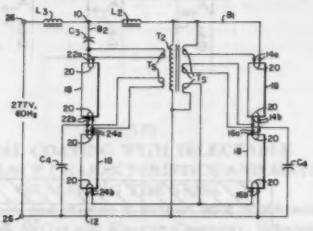
LEAD-LAG, SERIES-SEQUENCE STARTING AND OPERATING APPARATUS FOR THREE TO SIX FLUORESCENT LAMPS

Robert T. Elms, and Joseph C. Engel, both of Monroeville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 6, 1976, Ser. No. 646,795
Int. Cl.² H05B *41/232, 41/234*
U.S. Cl. 315—323 **20 Claims**

1. Apparatus for starting and operating from an AC source of predetermined frequency and potential three, four, five or six low-pressure, positive-column elongated discharge lamp means each having electrode coils connected to an individual double contact member affixed to each end of each said elongated discharge lamp means, said apparatus comprising:
a. two parallel circuit branches connected across two common circuit points in said apparatus, one of said circuit branches comprising a first inductor means and from one

to three pairs of output terminal means across which the double contact members of some of said lamp means are adapted to be connected, with said first inductor means and said lamp means as connected in said one circuit branch being in series-circuit relationship, the other of said circuit branches comprising ballast capacitor means and from one to three pairs of output terminal means across which the double contact members of the remainder of said lamp means are adapted to be connected, with said ballast capacitor means and said lamp means as connected in said other circuit branch being in series-circuit relationship, said output terminal means in at least one of said circuit branches comprising two or three pairs of series-connected output terminals, each said pair of output terminals adapted to have the double contact members of one of said lamp means connected thereacross, and starting capacitor means connected in parallel with a portion of said series-connected output terminals



sequentially to apply the available starting potential across each individual pair of said series-connected output terminals upon energization of said apparatus thereby to sequentially start said lamp means as connected thereacross;

b. input terminals adapted to be connected to said AC source of predetermined frequency and potential, second inductor ballast means connected between one of said input terminals and one of said common circuit points in said apparatus, the other of said common circuit points in said apparatus connected to the other of said input terminals, and said ballast capacitor means and said second inductor ballast means at said AC source predetermined frequency comprising a circuit which is at least partially resonant; and

c. means for applying a small predetermined lamp electrode coil preheating potential to said output terminal means upon energization of said apparatus.

4,006,385

HORIZONTAL DEFLECTION CIRCUIT

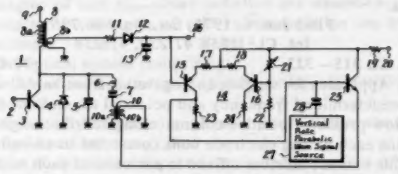
Toshio Onodera, Kamakura, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,807

Claims priority, application Japan, Nov. 29, 1974, 49-138012

Int. Cl.² H01J 29/70, 29/76

U.S. Cl. 315—400 **6 Claims**



1. A circuit arrangement for the horizontal deflection of a beam in a cathode ray tube comprising;

a. switching means with an output circuit means,

b. a horizontal deflection coil connected to said output circuit means,

c. means for supplying with a horizontal drive signal to switching means,

d. variable impedance means connected in series to said horizontal deflection coil,

e. detecting means connected to said switching means for detecting the level of an output signal of said switching means, and

f. control means connected between said detecting means and said variable impedance means for controlling the impedance of said variable impedance means in response to the detected output of said detecting means so as to prevent a horizontal deflection current flowing through said horizontal deflection coil from undesirable variations.

4,006,386

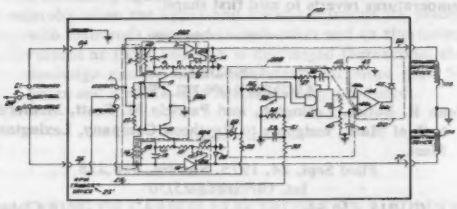
MONITOR AND SAFETY DEVICE FOR COIL SHIFTING CIRCUIT

Gene Duggan, 4403 Cresthill Drive SW., Roanoke, Va. 24018

Filed June 10, 1975, Ser. No. 585,692

Int. Cl.² H01H 47/00

U.S. Cl. 317—5 **4 Claims**



1. An improvement for an electric coil shifting mechanism including means operatively connecting the coil shifting mechanism to a shaft to be turned, said mechanism being operatively connected in a main circuit, the improvement which comprises,

a current monitoring means to automatically disengage the mechanism from said main circuit and a forward circuit control means and a rearward circuit control means,

a cross coupled interlock circuit means interconnecting the forward control circuit and the rearward control circuit means, and

an rpm detector circuit, and a speed interlock circuit means,

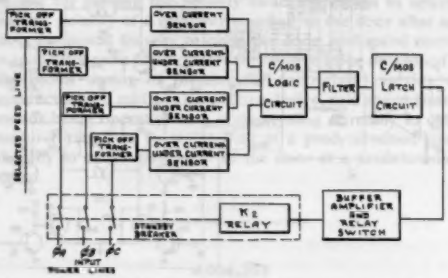
said rpm detector circuit and speed interlock circuit means being operatively connected to said main circuit;

said forward control circuit and the reverse control circuit each include silicon control rectifier circuit means including a resistor capacitor network and including a gate circuit network connected to the silicon control rectifiers, each RC network including a resistor divider and capacitors in series and each control circuit also including a discharge resistor in parallel with the respective associated capacitors of the RC network circuit means, said main circuit including a forward operating terminal and a rearward operating terminal and a forward shifting coil mechanism and a reverse shifting coil mechanism, in series with the respective forward and rearward operator terminals.

4,006,387
LOW POWER SOLID STATE THREE-PHASE OVERCURRENT/UNDERCURRENT PROTECTION CIRCUIT

Joseph M. Hudak, Rome, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 22, 1975, Ser. No. 615,759
Int. Cl.² H02H 3/26
U.S. Cl. 317—27 R **3 Claims**



1. A protection circuit for a three-phase electrical system comprising

a pick-off transformer connected to each phase of the system power input circuit,

an overcurrent/undercurrent sensing means connected to the secondary of each said pick-off transformer, each said overcurrent-undercurrent sensing means comprising a rectifier bridge, a slow response filter connected to the output of said rectifier bridge, a first operational amplifier connected to receive the output of said slow response filter, a first comparator means connected to the output of said first operational amplifier, a fast response filter connected to the output of said rectifier bridge, a second operational amplifier connected to receive the output of said fast response filter, and a second comparator means connected to the output of said second operational amplifier,

a pick-off transformer connected to a selected system feed line,

an overcurrent sensing means connected to the secondary of the feed line pick-off transformer, said overcurrent sensing means comprising a rectifier bridge, a slow response filter connected to the output of said rectifier bridge, an operational amplifier connected to receive the output of said slow response filter, and a comparator means connected to the output of said operational amplifier,

a logic circuit having an output responsive to the outputs of said overcurrent/undercurrent and overcurrent sensing means,

a standby breaker connected in said system power input circuit,

actuator means responsive to the output of said logic circuit for operating said standby breaker and,

a slow response filter connected to filter the output of said logic circuit.

4,006,388
THERMALLY CONTROLLED ELECTRONIC SYSTEM PACKAGE

Wesley E. Bartholomew, Palos Verdes, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

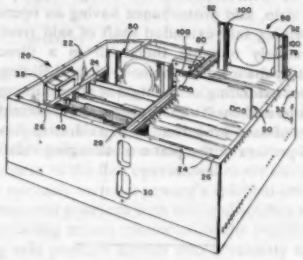
Filed Mar. 3, 1975, Ser. No. 554,789
Int. Cl.² H05K 7/20
U.S. Cl. 317—100 **14 Claims**

1. A carrier mechanism for mounting electronic devices, such as large scale integrated wafers, hybrid packages and discrete components, and for high thermal dissipation of heat generated by such electronic devices comprising:

a chassis including integral structure for defining electrical contact receptacles and at least first and second plenums positioned in substantially parallel spaced alignment and separated from one another, said first plenum having means including spaced walls for receiving a coolant and said second plenum having means including spaced walls for exhausting the coolant, with one of said plenum walls of each of said first and second plenums opposing one another and having therein plenum wall holes facing one another respectively for receiving and exhausting the coolant, said electrical contact receptacles extending substantially between said opposing plenum walls having said plenum wall holes therein;

a plurality of elongate guides secured to said plenum walls over said plenum wall holes, each comprising a pair of elongate receptacles of substantial U-shaped cross-sectional configuration facing one another and having guide holes therein aligned in communication with said plenum wall holes; and

a plurality of electronic modules supporting said electronic devices and slidably received in and between said facing



U-shaped modules, each of said electronic modules including

a mounting substrate of electrically insulating, high thermal conducting material having a generally rectangular configuration bounded by substantially parallel top and bottom edges, by a pair of substantially parallel side edges and by a pair of substantially parallel large area faces circumscribed by said edges, and having a plurality of contact pins extending along said bottom edge in electrical engagement with said electrical contact receptacles of said chassis,

an electronic assembly of said electronic devices mounted on one of said large area faces and electrically coupled to said contact pins,

a plurality of coolant fins directly secured to a second of said large area faces in high thermal contact therewith, and having coolant flow passages extending between said mounting substrate side edges, and

a frame member secured to and supporting said mounting substrate around the periphery of its outer surface and received within said elongate guides, each of said frame members having therein openings aligned and communicating with said coolant flow passages and with said guide and plenum wall holes.

4,006,389
VARIABLE DISC CAPACITOR

Harvey R. Bruning, Millburn, N.J., assignor to North American Philips Corporation, New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 556,821
Int. Cl.² H01G 5/06
U.S. Cl. 317—249 D **8 Claims**

1. A variable disk capacitor having first and second terminals comprising

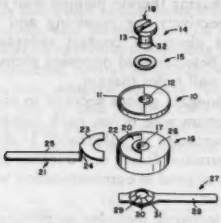
a first disk of dielectric material and including a first electrode;

a second disk of dielectric material and including a second electrode; and

means for pressing said first disk against said second disk, comprising

a rivet having a shaft rotatably extending through said first and said second disks; and

a monolithic spring clamp serving as one of said terminals; comprising an elongated strip including a portion having a convex proturbance extending at an angle approxi-



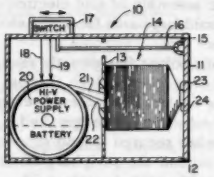
mately 45° with respect to said elongated strip on one side of said strip, said proturbance having an opening therein for receiving said extended shaft of said rivet and being cooperatively matable therewith in a direct physical contact by means of a conically shaped flaring portion of said rivet extending at an angle of approximately 45° with respect to said shaft and engaging the underside, concave portion of said proturbance in said strip having an extended portion in the plane of clamping relationship.

4,006,390

POCKET SIZED NON-LETHAL ELECTRICAL WEAPON

Alfred B. Levine, 2924 Terrace Drive, Chevy Chase, Md. 20015

Filed Nov. 20, 1975, Ser. No. 633,905
Int. Cl.² B68B *11/00*
U.S. Cl. 317—262 S **8 Claims**



1. A non-lethal electrical shocking weapon that is self-powered and produces a high voltage shocking potential comprising:

a powering source and manually operated switching means,

electrically conductive contactor probes interconnected to said powering source through said switching means, and through elongated electrical conductor means,

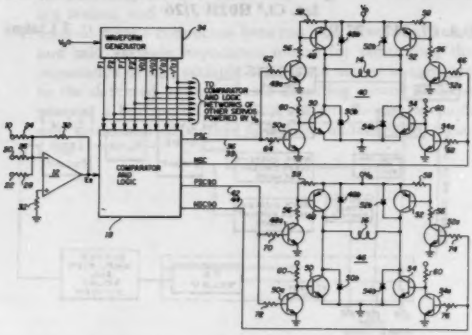
and a deployable supporting member for said contactor probes that when not in use reposes within a small confined volume adjacent said powering source and when extended, serves to project said contactor probes to an extended position at a distance from said power source while supporting said probes in a manner that permits positioning by the user.

4,006,391

LINEARIZED PULSE WIDTH MODULATOR

Charles S. Deering, Richardson, and William G. Redmond, Dallas, both of Tex., assignors to E-Systems, Inc., Dallas, Tex.

Filed Dec. 20, 1974, Ser. No. 535,149
Int. Cl.² H02P *5/40*
U.S. Cl. 318—227 **26 Claims**



1. A control system wherein an error signal indicates the torque and direction of rotation of a two phase servomotor having a reference winding and a control winding, comprising in combination:

means for generating a first periodic signal,

means for generating a second periodic signal that is the inverse of the first signal and in response to the first periodic signal,

first means for comparing the first periodic signal with a preestablished error signal and generating first and second enable signals,

first means for combining the first and second enable signals with first and second square wave signals to generate first and second output signals,

second means for comparing the error signal with the first and second periodic signals to generate first and second function signals, and

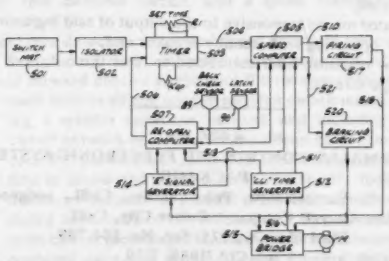
second means for combining the first and second function signals with the first and second output signals to generate first and second periodic output pulses to the control and reference windings of the servomotor.

4,006,392

ELECTRONIC SLIDING DOOR

John C. Catlett, 8735 N. 72nd St., Milwaukee, Wis. 53223, and James A. Blake, 5354 S. 116th St., Hales Corners, Wis. 53130

Filed Sept. 2, 1975, Ser. No. 609,508
Int. Cl.² G05D *3/08*
U.S. Cl. 318—266 **11 Claims**



1. An electronic door control system comprising a d.c. electric motor rotatable in one direction for opening a door

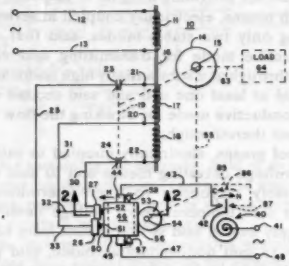
and in the opposite direction for closing the door, at least one semiconductor device for supplying d.c. power to the motor from an a.c. power source when said device is rendered conductive, polarity switching means for selecting the polarity of the d.c. power supplied to the motor thereby for controlling its direction of rotation, means for sensing the presence of an object near the door and operative to enable the conductivity of said semiconductor device and to cause the polarity switching means to select a first polarity of d.c. power supplied to the motor for a predetermined period thereby to open the door, means for causing the polarity switching means to select a second polarity of d.c. power supplied to the door after said door is opened thereby to close the door, and speed control means responsive to counterelectromotive force developed by the motor during its rotation for controllably varying the conductivity of said semiconductor device, said speed control means being operative in a sense tending normally to cause motor rotation to be maintained at a predetermined speed thereby to cause movement of the door at a predetermined speed.

4,006,393

MOTOR CONTROL SYSTEM USING A HEATED MEMBER TO PROVIDE MODULATION

Curtis E. Westley, St. Louis Park, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 21, 1975, Ser. No. 569,725
Int. Cl.² G05B *11/01*
U.S. Cl. 318—473 **6 Claims**



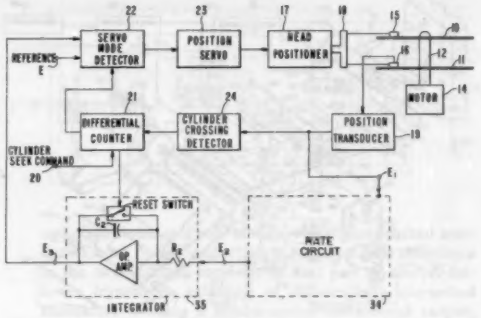
1. A modulating control system, including: bidirectional electric motor means adapted to be connected to a source of electric power to energize said motor means with said motor means including output means; said motor means including a first control circuit which when completed causes said motor means to operate in a first direction, and a second control circuit which when completed causes said motor to operate in a second direction; each of said control circuits including a safety limit switch to open circuit its associated control circuit in the event said motor means is caused to rotate to a predetermined safe limit; three position switch means including two snap switch means connected so as to have a center open position and two separate closed positions; said first control circuit completed through a first of said separate closed switch positions and said second control circuit completed through a second of said separate closed switch positions; thermally responsive means including electric heater means to cause said thermally responsive means to move when said electric heater means is energized; and said motor output means controlling said switch means in conjunction with the movement of said thermally responsive means; said thermally responsive means closing said switch means upon the temperature of said thermally responsive means changing to thereby cause said motor means to operate; said motor output means modulating and thereby causing said switch means to return to said center open position.

4,006,394

COARSE AND FINE CONTROL FOR POSITION SERVO

John Cuda, Saratoga, and Frank J. Sordello, Los Gatos, both of Calif., assignors to Information Storage Systems, Inc., Cupertino, Calif.

Continuation-in-part of Ser. No. 282,487, Dec. 21, 1972, abandoned. This application Nov. 18, 1974, Ser. No. 524,766
Int. Cl.² G05B *11/18*
U.S. Cl. 318—594 **4 Claims**



1. In combination with a servo system for incrementally positioning a movable member, said servo system being rendered operative under coarse and fine operational modes in response to position signals received from a single position sensor, mode control means for switching the servo system from the coarse to the fine operational mode during deceleration of the movable member toward a selected one of a plurality of incremental positions with minimal settling time, including differentiating means connected to the position sensor for converting said position signals into a velocity signal during movement of the movable member past each of said incremental positions, integrating means connected to said differentiating means for integrating said velocity signal in response to approach of the movable member to said selected one of the positions to generate a mode control signal and detector means connected to the integrating means for detecting a predetermined signal level of said integrated velocity signal to switch the servo system to the fine operational mode, whereby bias effects imposed on the position signals do not influence switching of the servo system to the fine operational mode.

4,006,395

APPARATUS FOR THE CONTROL OF PHOTOSENSITIVE MATERIAL HANDLING AND CUTTING OPERATIONS IN COMPUTER OUTPUT MICROFILMERS

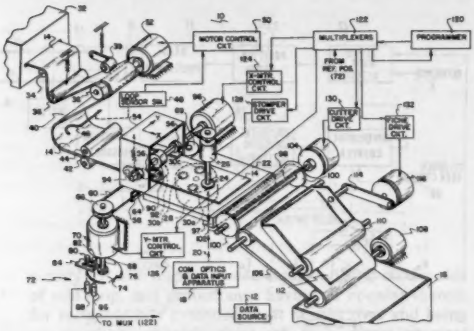
Jorgen Reesen, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,458
Int. Cl.² G05B *19/40*; G03B *27/32*
U.S. Cl. 318—685 **13 Claims**

1. For use in a computer output microfilmer which is adapted to record light images of frames in a sequence on successive image areas of a photosensitive material to form columns of recorded frames, the improvement comprising:

1. means for producing predetermined first and second sequences of control pulses,
2. a first stepping motor operatively associated with such material and responsive to said first squence of control pulses for moving the material laterally in a first direction across the width thereof to predetermined lateral positions,
3. a second stepping motor operatively associated with the material and responsive to said second sequences of control pulses for moving the material in a second direction perpendicular to said first direction to predetermined positions along said second direction, whereby successive image areas of the material are located by said first and second motors for the recording of a light image of frames in a column,

4. means responsive to particular pulses from said sequence producing means for maintaining located image areas in position during the recording of light images of frames,
5. means coupled to said first motor for providing output signals which correspond to the location of image areas of the material along said first direction and applying said output signals to said sequence producing means which in response thereto provides a selected one of said first sequence of control pulses, and



6. means defining a loop path for the material spaced from said first and second motors to facilitate movement of material in said first and second directions by said first and second motors, respectively including:
   i. feeding means operatively associated with the material and adapted when actuated for feeding material into said loop path, and
   ii. loop sensing means for sensing the size of the loop of material in said loop path and for controlling the actuation and de-actuation of said feeding means to control the size of the loop of material.

4,006,396

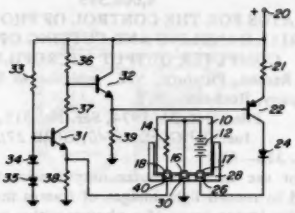
UNIVERSAL BATTERY CHARGING APPARATUS

Henry A. Bogut, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 434,526, Jan. 18, 1974, abandoned. This application Mar. 5, 1975, Ser. No. 555,476

Int. Cl.² H02J 7/00

U.S. Cl. 320—2 **20 Claims**



1. A battery charging system having a charging path for charging batteries having a variety of different capacities requiring different optimum charging rates, said system including in combination,
   a charging rate sensing circuit, at least one battery cell having an optimum charging rate,
   a fixed resistor related to a predetermined charging rate of said cell approximating the optimum charging rate thereof, and
   battery terminals connected to said cell and to said fixed resistor to form a battery for connecting the battery into the battery charging system with only said cell in said charging path and said fixed resistor in said charging rate sensing circuit.

4,006,397

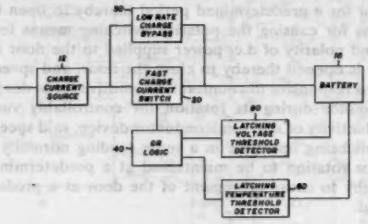
CONTROLLED BATTERY CHARGER SYSTEM

Arthur J. Catotti; John S. Hodgman, and Ferdinand H. Mullersman, all of Gainesville, Fla., assignors to General Electric Company, Columbus, Ohio

Filed Nov. 1, 1972, Ser. No. 302,908

Int. Cl.² H02J 7/04

U.S. Cl. 320—31 **16 Claims**



1. A battery charging system comprising:
   a. a rechargeable battery having at least one rechargeable cell;
   b. a source of charging current, electrically coupled to said at least one cell, for supplying charging current to said at least one cell along a first circuit path;
   c. temperature detecting means thermally coupled to said battery to monitor the temperature of said battery and to generate a signal in response thereto;
   d. voltage detecting means electrically coupled to said at least one cell for sensing the voltage of said at least one cell and for providing a signal in response thereto;
   e. switch means, electrically coupled in series in said path, having only two stable modes, said first mode being a conductive mode for transmitting said charge current therethrough at a substantially high uniform charging rate to said at least one cell and said second mode being a nonconductive mode for blocking the flow of said charge current therethrough;
   f. control means, electrically coupled to said temperature and voltage detecting means and to said switch means, invariably responsive to a predetermined signal from either said temperature or voltage detecting means to abruptly switch said switch means from said conductive mode to said nonconductive mode, said predetermined signals from said voltage and temperature detecting means corresponding, respectively, to a voltage approximating full charge of said at least one cell and to a temperature beyond which damage to said at least one cell could occur.

4,006,398

EXCITATION SYSTEM FOR MULTI-PHASE INDUCTION GENERATOR

David James Gritter, Elmhurst, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

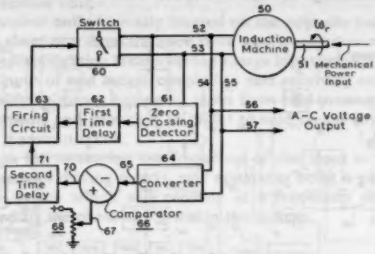
Filed Sept. 15, 1975, Ser. No. 613,147

Int. Cl.² H02P 9/00

U.S. Cl. 322—47 **5 Claims**

1. A system for sustaining the magnetic field of a three-phase induction machine receiving input mechanical energy over a driven shaft and operating as a generator, which machine has at least three output terminals for providing an alternating output voltage, comprising:
   three power switches, respectively coupled to the induction machine output terminals for effectively shorting the machine terminals responsive to receipt of a control signal; and
   a control circuit, coupled to the three power switches, for

providing control signals to effect sequential closure of the power switches and shorting of the induction machine



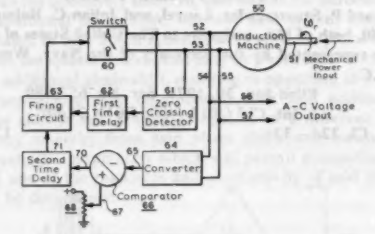
terminals to transform at least some of the mechanical energy into electrical field energy.

4,006,399

INDUCTION GENERATOR EXCITATION SYSTEM

George Henry Studtmann, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 15, 1975, Ser. No. 613,148
Int. Cl.² H02P 9/00
U.S. Cl. 322—47 13 Claims



1. A system for sustaining the magnetic field of an induction machine receiving input mechanical energy and operating as a generator, which machine has a pair of output terminals for providing an a-c output voltage, comprising:

switch means, having output connections coupled to the induction machine output terminals for effectively shorting the machine terminals responsive to receipt of a control signal; and

a control circuit, coupled to the switch means, for providing the control signal to effect closure of the switch means and shorting of the induction machine terminals to transform some of the mechanical input energy into electrical field energy.

4,006,400

REFERENCE VOLTAGE REGULATOR

Darrell L. Fett, Scottsdale, Ariz.; David E. Fulkerson, and Marvin L. Geske, both of Minnetonka, Minn., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Mar. 26, 1975, Ser. No. 562,277
Int. Cl.² G05F 1/44
U.S. Cl. 323—19 6 Claims

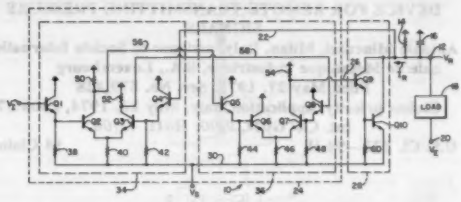
1. A system for regulating voltage, said system comprising:

means for referencing the voltage to be regulated;

means for comparing the referenced voltage to be regulated with a predefined voltage to be followed, said comparing means being operative to produce an error signal indicative of any difference between the compared voltages, said means for comparing voltages comprising a two stage differential amplifier, said first stage of amplification comprising:

means for receiving the input voltage conditions to said comparing means, wherein the input voltage conditions comprise the voltage to be regulated and the predefined voltage to be followed, said receiving means comprising a pair of emitter-follower transistors, each having a base connected to one of the input voltage conditions, and

a pair of differentially connected transistors each of which is base-connected to a corresponding normally conductive emitter terminal of one of said pair of emitter-follower transistors within said means for receiving the input volt-



age conditions, said pair of differentially connected transistors both being conductive in response to a difference in the two voltages received by said pair of emitter-follower transistors, said pair of differentially connected transistors forming a double-ended differential output, and

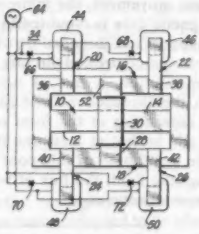
means responsive to said error signal and attached to said referencing means for inducing a change in the voltage to be regulated as the same appears on said referencing means.

4,006,401

ELECTROMAGNETIC GENERATOR

Eduardo Villasenor de Rivas, Los Angeles, Calif., assignor to Rene Villasenor de Rivas, Los Angeles, Calif.

Filed Dec. 12, 1975, Ser. No. 640,064
Int. Cl.² G05F 7/00
U.S. Cl. 323—92 4 Claims



1. An electromagnetic generator comprising:

a permanent magnet having a north and a south pole;

first and second magnetic flux circuit means each including a highly permeable member between said north and south poles external to said permanent magnet;

first and second core members associated with each of said first and second magnetic flux circuit means and each including means for saturating a region of the highly permeable member of said associated flux circuit substantially normal to the direction of flux flow in said highly permeable member to selectively block flux flow from said magnet in said associated highly permeable member;

a third core member composed of a highly permeable material connected at opposite ends to said first and second magnetic flux circuit means between said first and second core members respectively;

a winding of electrically conductive material on said third core member for connection to an external load circuit; and

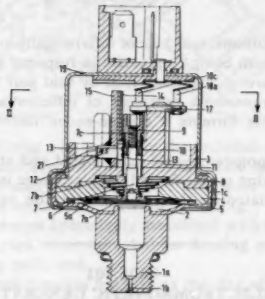
means for alternately operating said first core member and said second core member of said first and second flux circuit means respectively, and said second core member and said first core member of said first and second flux circuit means respectively whereby the direction of magnetic flux in said third core member from said permanent magnet is rapidly alternated to generate an alternating current in said winding for application to said load circuit.

4,006,402

DEVICE FOR REMOTE TRANSMITTING PRESSURE SIGNALS

Antonio Mincuzzi, Milan, Italy, assignor to Societe Internationale de Mecanique Industrielle, S.A., Luxembourg

Filed May 21, 1975, Ser. No. 579,428
Claims priority, application Italy, May 22, 1974, 23067/74
Int. Cl.² G01L *9/00*; H01L *43/08*
U.S. Cl. 323—94 H **14 Claims**



1. In a device for remote transmitting pressure signals, of the type comprising a chamber delimited by a pressure-sensitive flexible membrane and in communication with the fluid, the pressure of which has to be measured, and a mechanical-electrical transducer in the form of a magneto-resistor immersed in a magnetic field, the flux of which varies in relation to the membrane movement, the improvement comprising in that a ferromagnetic core is mounted in an axially adjustable position on a support rod threaded on one end thereof which is axially slidable and controlled directly by the movements of said flexible membrane, a nut of non-magnetic material, screwed on to the threaded end of said support rod, said ferromagnetic core being in the form of a ring and integral with said nut, and in that at least one magnetoresistor is arranged near the travel path of said core and is immersed in a permanent magnetic field, the flux of which is influenced by the moving ferromagnetic core.

4,006,403

ENGINE PERFORMANCE ANALYZER

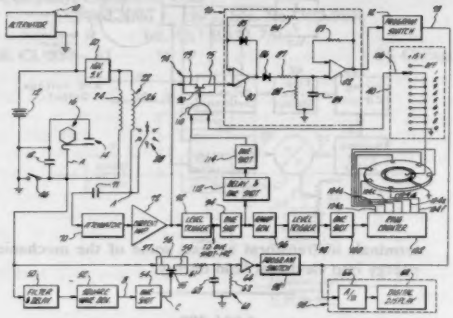
Dick Merlin Olsen, Pasadena; Charles H. Armstrong, and Gordon L. Brock, both of Huntington Beach, all of Calif., assignors to Clayton Manufacturing Company, El Monte, Calif.

Filed Apr. 11, 1975, Ser. No. 567,395
Int. Cl.² G01M *15/00*
U.S. Cl. 324—15 **28 Claims**

1. In an apparatus for analyzing the operation of a multiple cylinder internal combustion engine having an igniter for providing an electrical discharge in each cylinder and an ignition system for supplying an ignition pulse to the igniter to cause the cylinders to fire in a given sequence, the combination which comprises:

means responsive to the occurrence of each ignition pulse for producing a spark line sampling signal for defining a sampling interval during the time interval of the sustained electrical discharge in each cylinder;

cylinder identification means coupled to the ignition system for generating a separate cylinder identification signal which corresponds with the time interval of the electrical discharge in each individual cylinder; and



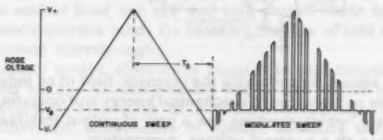
means activated upon concurrence of the spark line sampling signal and a selected cylinder identification signal for providing a measure of the voltage supplied to the igniter of the selected cylinder during said sampling interval.

4,006,404

PULSED PLASMA PROBE

Edward P. Szuszczewicz, Laurel, and Julian C. Holmes, Oxon Hill, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 30, 1976, Ser. No. 653,880
Int. Cl.² G01J *1/00*; G01N *27/00*
U.S. Cl. 324—33 **12 Claims**



1. A device for plasma investigation for applying a voltage to a probe and measuring the current collected by said probe comprising:

generator means for providing a sweep voltage;

modulator means coupled to said generator means to provide a pulse-modulated voltage for application to said probe, the output of said modulator means being coupled to said probe; and

measuring means coupled to said probe to measure current collected by said probe.

4,006,405

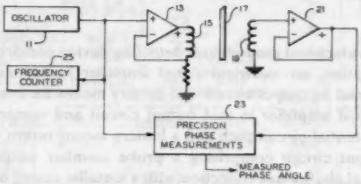
METHOD AND APPARATUS FOR MEASURING PARAMETERS OF A CONDUCTIVE MATERIAL WHICH CAN BE USED IN INDEPENDENTLY DETERMINING THICKNESS AND CONDUCTIVITY

Ivan A. Greenwood, Stamford, Conn., and Donald S. Bayley, Bedford, N.Y., assignors to The Singer Company, Little Falls, N.J.

Filed Jan. 13, 1975, Ser. No. 540,624
Int. Cl.² G01R *33/12*
U.S. Cl. 324—34 TK **9 Claims**

1. Apparatus for measuring parameters which will permit computing at least one of the thickness and conductivity of a sheet of electrically conductive material without independent information of sheet thickness or sheet conductivity comprising:

a. a transmitter coil physically located on one side of the sheet to be measured;
b. means providing an alternating current drive to said transmitter coil;
c. a receiver coil physically located on the opposite side of said sheet at a fixed distance from said transmitter coil;
d. a preamplification means having a large input impedance, the input of said means coupled to said receiving coil;
e. amplifying means having an input from said preamplifying means and providing an input to said means driving said transmitter coil;
f. means for measuring the frequency of the input to said transmitter driving means, said apparatus being a closed loop system which will oscillate at a frequency determined by the phase shifts within the system;



g. means in said amplifying means for introducing an additional phase shift into said loop; and
h. means for selectively inserting said means for introducing an additional phase shift, whereby said system may be operated to take a first measurement with the phase shift within the system determined only by phase shifts without said additional phase shift, resulting in operation at a first frequency and may be operated with said additional phase shift in said system to operate at a different frequency whereby from said phase shifts and measured frequencies, parameters which will permit computing at least one of the thickness and conductivity of said sheet may be determined.

4,006,406
INDUCTIVELY OPERATED SENSOR FOR TESTING TECHNOLOGICAL QUANTITIES OF A FERROMAGNETIC WORK PIECE

Joachim Rodicker, Braunschweig, Germany, assignor to Volkswagenwerk AG., Wolfsburg, Germany

Continuation of Ser. No. 404,854, Oct. 10, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,385
Claims priority, application Germany, Oct. 26, 1973, 2252465
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—34 R **9 Claims**

1. An inductively operated sensor for the measurement of a property of a non-planar ferromagnetic workpiece, comprising

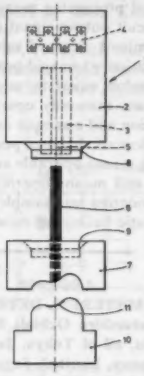
a paramagnetic housing;

a coil arrangement in said housing and including primary and secondary windings;

a paramagnetic measuring head having a first side, and a second side which is provided with a measuring surface having a contour substantially matching the non-planar contour of a workpiece surface, a part of which is to be measured;

a magnetic core mounted in said measuring head and having an endface which is exposed at said measuring surface for direct contact of said endface with said part of said workpiece surface when said measuring surface is placed into mating engagement with said workpiece surface, and an end portion projecting from said first side into operative association with said coil arrangement;

cooperating coupling portions on said housing and first side for detachably coupling said measuring head to said housing; and

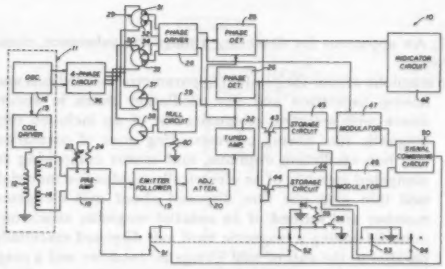


electric terminals on said housing for connecting an electronic measuring device.

4,006,407
NON-DESTRUCTIVE TESTING SYSTEMS HAVING AUTOMATIC BALANCE AND SAMPLE AND HOLD OPERATIONAL MODES

John J. Flaherty, Elk Grove Village, and Eric J. Strauts, Chicago, both of Ill., assignors to Magnaflux Corporation, Chicago, Ill.

Filed Mar. 10, 1975, Ser. No. 556,898
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—40 **10 Claims**



1. In a non-destructive testing system comprising a probe circuit including probe means adapted to be placed in proximity to a part to develop an output signal according to characteristics of the part, indicating means, and signal processing means having input means coupled to said probe circuit to respond to said output signal thereof and having output means coupled to said indicating means, said signal processing means including circuit means responsive to at least a component of said probe circuit output signal to apply a corresponding drive signal to said indicating means, a predetermined value of said drive signal being operative to produce a reference null indication by said indicating means, said circuit means including automatic balancing means for maintaining said drive signal at an average value equal to said predetermined value irrespective of relatively slow changes in the average value of said probe circuit output signal component while allowing changes in said drive signal in response to rapid changes in said probe circuit output signal component, said circuit means further including sample and hold means including a switch manually operable between a sample position and a hold position, sample means operative in said sample position of said switch to develop a voltage corresponding to the existing value of said

probe circuit output signal component, and hold means operative upon operation of said switch from said sample position to said hold position to store said voltage and to apply said stored voltage in said signal processing means in a direction to oppose said probe circuit output signal component and to produce said predetermined value of said drive signal and said reference null indication when said probe circuit output signal component has a value equal to said existing value, mode selector switch means manually operable between an automatic balance position and a sample and hold position, means operative in said automatic balance position for rendering said automatic balancing means operable and said sample and hold means inoperable, and means operative in said sample and hold position for rendering said sample and hold means operable and said automatic balancing means inoperable.

4,006,408

MAGNETIC MATERIAL DETECTING DEVICE

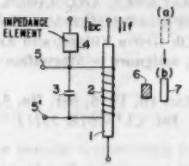
Takao Sugisaki; Tatsushiro Ochiai; Kyoichi Nishikawa, and Minoru Higurashi, all of Tokyo, Japan, assignors to TDK Electronics Company, Limited, Japan

Filed Feb. 7, 1973, Ser. No. 330,264

Claims priority, application Japan, Mar. 2, 1972, 47-21787; Mar. 2, 1972, 47-21788; Mar. 17, 1972, 47-27242

Int. Cl.² G01R *33/12, 33/02*

U.S. Cl. 324—41 **10 Claims**



1. An apparatus for detecting a magnetic substance, comprising:

a magnetic sensor for producing parametric oscillations and having oscillation and non-oscillation states in accordance with selective magnetization of an included thin magnetic film having corresponding ones of oscillation and non-oscillation domains, said sensor comprising an elongated member of an electrically conductive material, said thin magnetic film disposed about said elongated member and formed of an uniaxial magnetic anisotropy material having a magnetic hard axis disposed essentially parallel to the axis of said elongated member and a magnetic easy axis disposed about the circumference of said elongated member, and a detecting coil wound about said elongated member for producing first and second outputs in response to the oscillation and non-oscillation states of said sensor,

first means for establishing a magnetic field along said easy axis,

second means for producing a magnetic field coupled to said sensor in the direction of said hard axis to produce magnetization of said thin film in a predetermined one of said oscillation and non-oscillation domains, and the corresponding one of said oscillation and non-oscillation states of said sensor,

third means for detecting a change in the state of the oscillation output from said detecting coil, and

means for moving said magnetic substance adjacent said second means thereby altering said hard axis magnetic field, correspondingly altering the magnetization of said thin film to the other of said oscillation and non-oscillation domains and correspondingly producing the other of said oscillation and non-oscillation states of said sensor, and thereby the corresponding one of said outputs from said detecting coil.

4,006,409

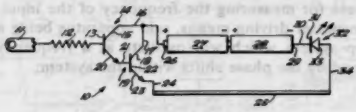
ELECTRICAL GROUND FAULT DETECTING DEVICE

Bertram C. Adams, 2295 NW. 14th St., Miami, Fla. 33125

Continuation-in-part of Ser. No. 389,451, Aug. 20, 1973, abandoned. This application Aug. 23, 1974, Ser. No. 499,827

Int. Cl.² G01R *31/02, 19/16*

U.S. Cl. 324—51 **4 Claims**



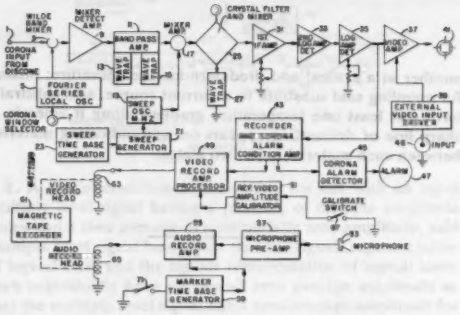
1. An electrical ground fault detecting device comprising, in combination, an electrical signal amplifier having an input circuit and an output circuit and battery means for energizing said signal amplifier in said output circuit and comprising a high potential circuit path and a battery means return circuit, said input circuit comprising a probe member adapted for electrical abutment connection with a metallic casing or housing for detecting a 60 cycle alternating current electrical potential thereof with respect to earth ground, said output circuit comprising a signal indicator means responsive to a detected 50 to 60 cycle alternating current potential, an elongated, tubular, electrically-conductive housing member, said housing member comprising support means for said electrical signal amplifier and serving as a handle for the manual application of said probe into abutting contact with the metallic casing or housing being tested for ground fault, said input circuit being responsive to the capacitive coupling between the body of the person holding the device and earth ground to supply a detected alternating current potential of sufficient amplitude for operation of the device, said indicating means being unresponsive to direct current leakage from said battery return circuit including the body of a person holding the device in any external resistive return circuit to said probe, said input circuit comprising a current limiting resistor in series with said probe member, said probe member projecting outwardly of one end of said housing member, said battery means comprising a pair of tubular dry cells coaxially disposed in series connection within said housing member, said signal indicator means comprising a light emitting diode positioned at the other end of said housing member, said input circuit comprising input and output transistors in cascade, a probe assembly, said probe assembly comprising a tubular, non-electrically conductive support member, means securing one end of said tubular support member within one end of said tubular metallic housing member, said probe member extending outwardly of the other end of said tubular support member, said current limiting resistor and said input and output transistors being supported by and within said tubular support member, and abutment contact means electrically interconnecting said output circuit with said metallic housing member and with one terminal contact of said dry cell battery, a non-electrically conductive screw-cap member, means threadingly receiving said screw-cap member within the other end of said tubular housing member, said light emitting diode being supported centrally within and being visible from the outer end of said screw-cap member, and means for establishing abutting electrical contact of one electrical terminal of said light emitting diode with said tubular housing member, and the other electrical terminal of said light emitting diode with the remaining terminal contact of said dry cell battery upon inter-threadingly engaging said screw-cap member with respect to said other end of said tubular housing member.

4,006,410

CORONA DISCHARGE DETECTION SYSTEM FOR DETECTING THE PRESENCE OF ANY CORONA DISCHARGE IN AN ELECTRICAL SYSTEM

Danvern R. Roberts, El Paso, Tex., assignor to Lee A. Chagra, El Paso, Tex., a part interest

Filed Dec. 19, 1975, Ser. No. 642,550
Int. Cl.[2] G01R *31/08, 13/04*
U.S. Cl. 324—52 10 Claims



1. A corona discharge detection system comprising:

detection means for detecting corona discharges in an electrical system;

selection means coupled to said detection means for selecting only specified frequency components of any detected corona discharges;

processing means coupled to said selection means for processing said selected frequency components to produce video corona discharge data for each detected corona discharge;

recording means having a first track and a second track.

recorder and corona alarm detection condition amplifier means coupled to the output of said processing means;

corona alarm means coupled to said recorder and corona alarm condition amplifier means for producing an alarm indication in response to any video corona discharge data from said recorder and corona alarm condition amplifier means;

a video record amplifier processor for amplifying and processing any video corona discharge data from said recorder and corona alarm condition amplifier means;

means coupled to the output of said video record amplifier processor for recording any video corona discharge data output from said video record amplifier processor on said first track of said recording means;

audio record amplifier means having a first input, a second input and an output;

means to apply voice frequency logging information signals to said first input of said audio record amplifier means;

a marker time base generator coupled to said second input of said audio record amplifier means, said marker time base generator providing geographic data signals indicative of the geographic location of any detected corona discharges; and

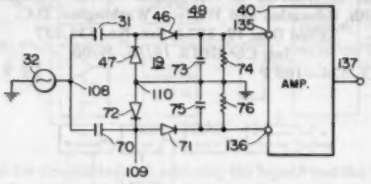
means coupled to said output of said audio record amplifier means to record said voice frequency logging information signals and said geographic data signals from said marker and time base generator on said second track of said recording means.

4,006,411

STATIC CAPACITANCE TYPE SENSOR

Masatake Akagawa, Yachiyo, and Takeshi Maki, Kawasaki, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 29, 1975, Ser. No. 572,897
Claims priority, application Japan, Apr. 30, 1974, 49-48980
Int. Cl.[2] G01R *27/26*
U.S. Cl. 324—61 R 8 Claims



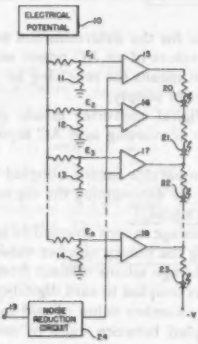
7. A static capacitance type yarn denier sensing circuit as set forth in 1, including equalizer means coupled to said first and second voltage doubler circuits for equalizing the outputs therefrom when the yarn denier is a constant.

4,006,412

DIGITAL DISPLAY SYSTEM CIRCUIT

Kenneth J. Campbell, Solana Beach, and Douglas H. Mogle, San Diego, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 29, 1974, Ser. No. 518,687
Int. Cl.[2] G01R *13/02, 31/00;* H03K *5/20*
U.S. Cl. 324—96 8 Claims



1. A digital display system circuit for visually indicating the amplitude of a received signal comprising:

a plurality of reference signals incrementally graduated from a low amplitude to a high amplitude;

a plurality of comparators having first and second inputs, each of said comparators having its first input connected to a different one of said reference signals and its second input connected to said received signal for producing an output of fixed amplitude of one polarity when its second input exceeds its first input and producing an output of substantially the same fixed amplitude but of opposite polarity in response to lesser amplitudes of said second input; and

a plurality of series connected light emitting means, each connected between the outputs of two adjacent comparators and responsive to the electrical potential developed by a difference of polarity therebetween for energizing one of said light emitting means indicating that the re-

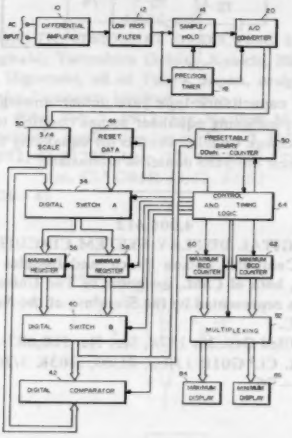
ceived signal has an amplitude within the range of the two incrementally graduated reference signals connected as first inputs to the two adjacent comparators developing said difference of polarity therebetween.

4,006,413

FIELD INSTRUMENT FOR MEASUREMENT OF AC VOLTAGE FLUCTUATIONS

Jeffrey L. Silberberg, Baltimore, Md., assignor to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Dec. 19, 1974, Ser. No. 534,237
Int. Cl.² G01R *19/16, 19/00*
U.S. Cl. 324—103 P **9 Claims**



9. A monitor for the determination and display of sag and surge voltage values of an AC power supply comprising:

voltage input means for receiving an AC input signal from an AC power supply;

an analog/digital converter means coupled to said input means for converting said AC input signal into a binary number;

a digital comparator means coupled to said analog/digital converter for determining the sag and surge values of said AC input signal;

maximum storage means coupled to said digital comparator for storing the binary number value of said surge value;

minimum storage means distinct from said maximum storage means coupled to said digital comparator for storing the binary number value of said sag value;

means coupled between each of said minimum and said maximum means and said comparator means, for indicating which binary number stored in the maximum storage means and said minimum storage means is to be compared with the binary number stored in said comparator; and

output means coupled to said maximum storage means and to said minimum storage means for displaying sag and surge values.

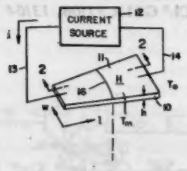
4,006,414

INDICATING DEVICE

Robert Parker, Danville, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 69,399, Sept. 3, 1970, abandoned. This application Apr. 2, 1973, Ser. No. 346,877
Int. Cl. G01r *31/00*
U.S. Cl. 324—106 **7 Claims**

1. An indicating device comprising: a first thin foil-like substrate comprising: material of low thermal and electrical conductivity having at least one tapered section; means for suspending at least a portion of said substrate in ambient gas at two ends; temperature indicating material carried by said substrate such material changing from one physical state to



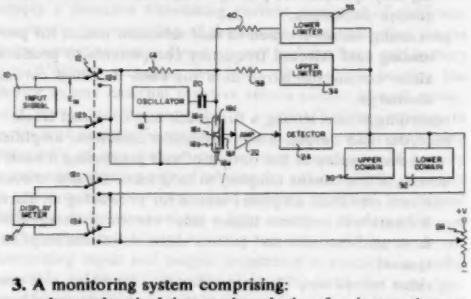
another at a critical and predetermined temperature; means for coupling said substrate to a current source, said substrate having at least one temperature gradient along it wherein a sharp line of delineating appears on said indicating material between such material in its two states.

4,006,415

FAST RESET INTEGRATOR

Eugene P. Finger, Brewster, N.Y., assignor to Curtis Instruments, Inc., Mount Kisco, N.Y.

Filed May 12, 1975, Ser. No. 576,390
Int. Cl.³ G04F *8/00*
U.S. Cl. 324—182 **17 Claims**



3. A monitoring system comprising:

an electrochemical integrating device for integrating an applied DC signal in a first direction in response to a signal applied thereto with a first polarity and in an opposite direction in response to a signal applied thereto with a second polarity;

first switch means for coupling said DC signal to said integrating device with either said first polarity or said second polarity;

means for reading the integrated value of said DC signal stored in said integrating device and producing an output DC voltage that varies in response to said integrated value;

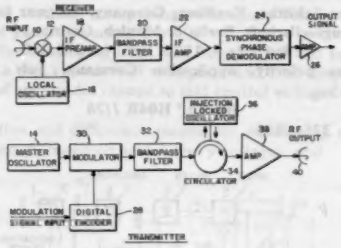
means for storing an output DC voltage read at the beginning of an integration cycle; and

a display device to which are applied a first signal corresponding to the voltage stored by said output voltage storing means and a second signal corresponding to the output DC voltage from the integrating device, said display device having an output display that is a function of the difference between said first and second signals applied thereto.

4,006,416
DIGITAL COMMUNICATION SYSTEM

Harvey L. Pastan, Chestnut Hill, and Arthur H. Solomon, Winchester, both of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed Jan. 31, 1975, Ser. No. 545,790
Int. Cl.² H04L 27/10, 3/00
U.S. Cl. 325—30 **7 Claims**



1. A digital communication system for use with an input multiple level signal having a plurality of discrete amplitude states and a time average of substantially zero amplitude, said multiple level signal being such that the signals representative of logical ones and the signals representative of logical zeros each individually have an overall zero average amplitude so that the multiple level signal has a zero average amplitude for all data conditions, the digital communication system comprising:

means for providing a carrier signal of predetermined frequency;

means for providing said multiple level signal;

signal modulation means operative in response to said multiple level signal and said carrier signal to provide a phase-modulated output signal directly corresponding to said multiple level signal, the phase states thereof being representative of logical ones and zeros and said phase-modulated signal being such that signals representative of logical ones and signals representative of logical zeros each individually have an overall zero average phase causing the phase-modulated signal to have a zero average phase and defining a zero reference state for all data conditions;

means for transmitting said phase-modulated output signal;

means for receiving said transmitted output signal; and

demodulator means operative in response to only said received output signal and substantially independently of the data rate of said multiple level signal to directly reproduce said multiple level signal;

said demodulator means including means employing the average zero phase of said received output signal as a baseband demodulation reference.

4,006,417
TACHOMETER

W. David Pace, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

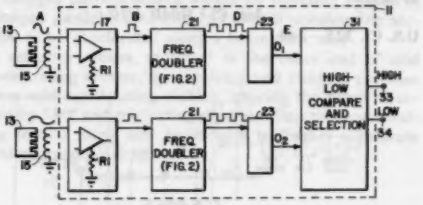
Filed June 12, 1975, Ser. No. 586,471
Int. Cl.² G01P 3/60, 3/48
U.S. Cl. 324—166 **3 Claims**

1. A tachometer for measuring and comparing the angular speed of a first and a second wheel of a vehicle, comprising:

first and second means for sensing the angular speed of said first and said second wheel to generate a first and a second pulse train of varying repetition rates, said repetition rates being proportional to the angular velocity of said first and said second wheel respectively;

first and second means for doubling the repetition rate of said first and said second pulse trains respectively and fixing the pulses of the frequency doubled pulse train to have same pulse width and amplitude;

means for integrating the frequency doubled first and second pulse trains respectively to generate a first and a second DC outputs which vary in amplitudes in proportion to the variation of the angular speed of said first and second wheel respectively; and

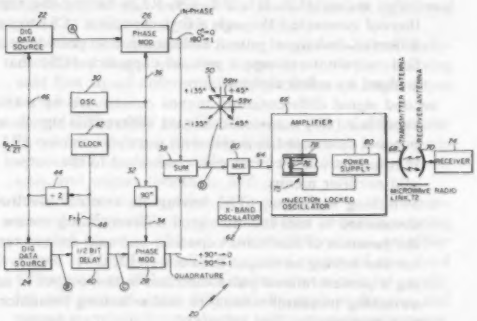


means for comparing and selecting the higher and the lower amplitudes of said first and second DC outputs and providing the higher amplitude output and the lower amplitude output separately.

4,006,418
QUATERNARY PHASE-SHIFT KEYING WITH TIME DELAYED CHANNEL

Nathan A. Liskov, Waltham; William J. Bickford, Weston, and Paul J. Tanzi, Wayland, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed May 14, 1975, Ser. No. 577,268
Int. Cl.² H04L 27/18
U.S. Cl. 325—163 **5 Claims**



1. A system for transmitting quaternary phase-modulated signals obtained from binary data signals of first and second sources thereof, the system comprising:

means for delaying data of said second source relative to data of said first source by an amount equal to approximately one-half of the duration of one bit of said data;

first means for phase modulating said data of said first source on a carrier signal;

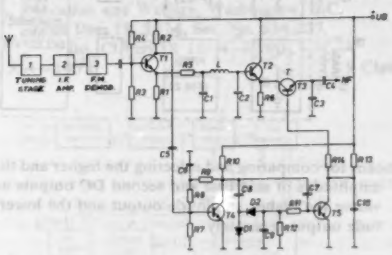
second means for phase modulating said delayed data on a second carrier signal having a phase quadrature relation to said first carrier signal; and

means coupled to said first and said second phase modulating means for amplifying the sum of the outputs of said first and said second modulating means, said amplifying means comprising phaselocking oscillator means.

4,006,419
PULSE INTERFERENCE BLANKING CIRCUIT FOR RADIO RECEIVERS

Helmut Liman, Klein Escherde uber Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany

Filed July 25, 1975, Ser. No. 599,134
Claims priority, application Germany, Mar. 21, 1975, 2512412
Int. Cl.² H04B 1/10
U.S. Cl. 325—348 2 Claims



1. A pulse interference suppression circuit for a radio receiver having a demodulator circuit, said interference suppression circuit comprising, in combination:

first signal differentiating means for differentiating the signal appearing at the output of a demodulator of a radio receiver and supplying a differentiated signal to the remainder of the interference suppression circuit, said first differentiating means including an amplifying transistor (T4) providing a differentiated signal output, a high-pass input coupling network (C5, R7) for said amplifying transistor connecting the control electrode of said transistor to said demodulator output, and a low-pass feedback and bias network (C6, R8, R9) for said transistor providing bias current as well as feedback to said control electrode;

rectifier means (C8, D1, D2, C9, R12) having the input thereof connected through a first capacitor (C8) to said differentiated signal output and arranged to provide rectified current to charge a second capacitor (C9) that is bridged by a first resistor;

second signal differentiating means constituted by a third capacitor (C7) connected to said differential signal output and connected in series with a second resistor (R11) that has its other connection connected to the output of said rectifier means;

a switching transistor (T5) having its control electrode connected to said second signal differentiating means at the junction of said third capacitor and said second resistor and having an output network (R13, C10) for providing a predetermined pulse duration in the output of said switching transistor whenever said switching transistor is switched on;

said rectifying means being poled so as to provide a bias for said switching transistor that must be overcome by the output of said second differentiating means to cause said switching transistor to be switched on, and

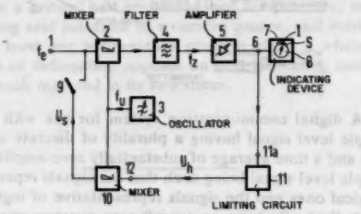
blanking switch means (T3) for said radio receiver having a signal input connected through a delay circuit to said demodulator output and having a switching input in circuit with said output network of said switching transistor,

whereby the magnitude of said first capacitor (C8) limits the increment of charge of said second capacitor (C9) produced by said rectifying means in response to a single pulse in the output of said amplifying transistor, but the persistent presence of a high-frequency periodic disturbing voltage cumulatively biases off said switching transistor to such an extent that pulses derived from said high-frequency periodic disturbing voltage by said second differentiating circuit are rendered unable to turn on said switching transistor without precluding isolated disturbing pulses of higher peak voltage from turning on said switching transistor and thereby producing a pulse of said duration determined by said output network of said switching transistor.

4,006,420
CALIBRATABLE HETERODYNE RECEIVER

Johannes Schittko, Krailling, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 5, 1973, Ser. No. 376,348
Claims priority, application Germany, July 7, 1972, 2233533
Int. Cl.² H04B 1/26
U.S. Cl. 325—363 5 Claims



1. An amplitude calibratable heterodyne receiver comprising: a first mixer having first and second inputs and an output for providing an intermediate frequency in response to an incoming frequency received at the first input of the mixer, a band pass filter connected to the output of said first mixer, amplifier means connected to said band pass filter, an indication device having a calibration indicia connected to the output of said amplifier means, a heterodyne oscillator producing a heterodyne frequency connected to said second input of said first mixer, a second mixer having first and second inputs and an output, said second input of said second mixer connected to said heterodyne oscillator, a limiting circuit connected between the output of said amplifier means and said first input of said second mixer for deriving an auxiliary voltage, and means for connecting the output of said second mixer to the first input of said first mixer to provide a signal at a phase which effects self oscillation around the circuit including said first and second mixers, said band pass filter and said amplifier means, said amplifier means having means for adjusting the gain thereof so that the output of said amplifier means causes said indicating device to indicate calibration on said calibration indicia.

4,006,421
MEANS FOR IMPROVING THE SIGNAL/NOISE RATIO OF SIGNALS PICKED UP BY AERIALS COMPRISING SEVERAL ELEMENTS

Henri Mermoz, Sanary-sur-Mer, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed June 21, 1967, Ser. No. 649,421
Claims priority, application France, Oct. 13, 1966, 66.79765; Feb. 22, 1967, 67.96072; Feb. 23, 1967, 67.96240
Int. Cl.² H04B 1/10
U.S. Cl. 325—474 15 Claims

1. Arrangement for improving the "useful signal/noise" ratio of electric signals received on at least two aerials, applicable in the case where the useful signals occupy a band of narrow frequencies around a mean value f_o, and in which the noises B_1 and B_2 received on the two aerials are at least partially intercorrelated, said arrangement comprising:

first compensating means including delay means for making identical with a common value S the useful signals ema-

nating from each aerial to develop first and second compensated aggregate signals $\Sigma_1 = S \not\sim B$ and $\Sigma_2 = S \not\sim B_2$,

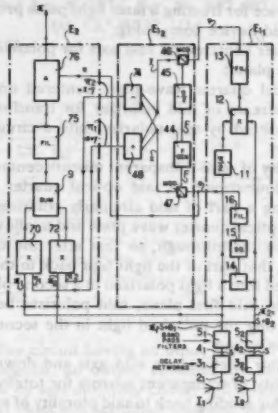
a first assembly including means for developing an electric control voltage u which is a function of the intercorrelation coefficient of the noises B_1 and B_2, and

means for developing an electric control voltage v proportional to the intercorrelation coefficient of the noises B_1 and B_2 brought into phase quadrature with respect to one another,

a second assembly comprising an auxiliary voltage generator of given frequency $F \neq f_o$,

means for developing from said frequency F and said voltages u and v sinusoidal voltages x and y of frequency F and of amplitudes related to said control voltages u and v, and

summation and difference means, for developing voltages π_1 and π_2 based on said x and y voltages, and



a third assembly comprising means for respectively multiplying with one another the voltages π_1 and Σ_1, on the one hand, and π_2 and Σ_2 on the other hand to develop two products,

summing means for taking the sum of the said products,

second compensating means coupled to said summing means and to at least one of said first and second assemblies for compensating said product sum for the compensation effected by said first compensating means to develop the desired useful signal with reduced noise.

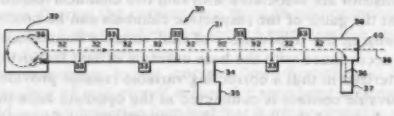
said second compensating means including controlled gain amplifier means coupled to said summing means for receiving said product sum therefrom and having a gain inversely related to at least one of said u and v control voltages.

4,006,422

DOUBLE PASS LINEAR ACCELERATOR OPERATING IN A STANDING WAVE MODE

Stanley O. Schriber, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 3, 1975, Ser. No. 554,562
Claims priority, application Canada, Aug. 1, 1974, 206107
Int. Cl.² H01J 23/20; H05H 9/04
U.S. Cl. 328—233 **6 Claims**



1. A linear accelerator system comprising:

a. an accelerating section having a series of accelerating cavities coupled by coupling cavities; each of said cavities being tuned to a predetermined frequency;

b. a microwave souce means coupled to said accelerating section for exciting a standing wave field in said accelerating section;

c. a charged particle source means for injecting a beam of charged particles into one end of said accelerating section, to be accelerated along a beam path; and

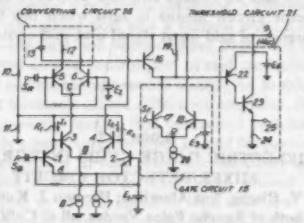
d. a reflector means, mounted at the other end of said accelerating section, for receiving said charged particles from said accelerating section, altering the beam direction by 180° and reinjecting the beam into said accelerating section along said beam path to further accelerate said charged particles.

4,006,423

PHASE DETECTOR

Yasunobu Kuniyoshi, and Kazuo Yamagiwa, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 568,782
Claims priority, application Japan, Apr. 25, 1974, 49-46942
Int. Cl.² H03K 5/20
U.S. Cl. 329—103 **9 Claims**



1. A phase detector for producing an output signal representing the difference between the phase of a first signal and the phase of a second signal, comprising:

a first differential amplifier having a pair of differentially-connected stages including input terminals for receiving said first signal differentially applied thereto, and output terminals;

a second differential amplifier having a pair of differentially-connected stages including input terminals respectively connected to said first differential amplifier output terminals, and output terminals; and

a third differential amplifier having a pair of common-connected differential stages, the common connection being coupled to one of said second differential amplifier stages, said differentially-connected stages of said third differential amplifier including input terminals for receiving said second signal differentially applied thereto, and output terminals for producing said output signal proportional to the phase difference between the output of said second differential amplifier and said second signal.

4,006,424

WIDE BANDWIDTH CRYSTAL FREQUENCY DISCRIMINATOR CIRCUIT

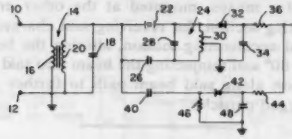
Charles W. Pond, Costa Mesa, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 9, 1976, Ser. No. 656,225
Int. Cl.² H03D 3/16
U.S. Cl. 329—117 **6 Claims**

1. A discriminator circuit for providing a unidirectional output voltage indicative of the instantaneous frequency deviation of a frequency modulated input signal from a center frequency comprising:

input circuit means for receiving said frequency modulated input signal;

crystal filter means coupled to said input circuit means and having a predetermined voltage versus frequency characteristic including a portion wherein the voltage varies substantially linearly as a function of frequency, said crystal filter means including a crystal resonator having a series resonant frequency at a frequency higher than the frequencies corresponding to said substantially linear portion of said voltage versus frequency characteristic;



detector circuit means coupled to said crystal filter means for rectifying the output voltage from said crystal filter means; and

voltage level shifting means coupled between said input circuit means and said detector circuit means for algebraically combining the output voltage from said detector circuit means with a dc voltage such that the algebraic sum of said dc voltage and said output voltage from said detector circuit means is zero when the instantaneous frequency of said input signal is at said center frequency.

4,006,425

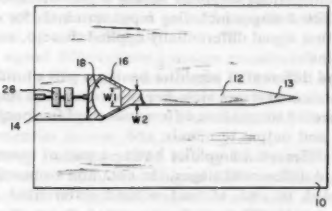
DIELECTRIC IMAGE GUIDE INTEGRATED MIXER/DETECTOR CIRCUIT

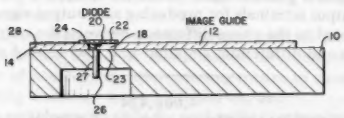
Yu-Wen Y. Chang, Los Alamitos; Hiromu J. Kuno, and Pei Y. Chao, both of Rancho Palos Verdes, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 22, 1976, Ser. No. 669,054

Int. Cl.² H03D 9/02; H01P 3/20

U.S. Cl. 329—160 **10 Claims**





6. An image integrated circuit including, in combination:

a. a metallic ground plane,

b. an image guide wave transmission section of predetermined height and width mounted on said ground plane,

c. an image guide transition section joined to said transmission section and having a cavity therein with an opening which is wider than the width of said transmission section, and

d. a diode mounted in said cavity for providing mixing or detection of microwave or millimeter wave energy received from said image guide transmission section.

4,006,426

DEVICE FOR TREATING A LASER LIGHT PULSE

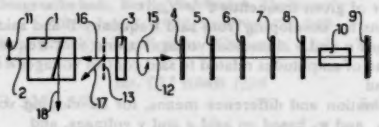
Bernard Lacour, Villebon-sur-Yvette, France, assignor to Compagnie Industrielle des Lasers, Marcoussis, France

Filed Dec. 1, 1975, Ser. No. 636,493

Claims priority, application France, Dec. 16, 1974, 74.41380

Int. Cl.² H01S 3/09

U.S. Cl. 330—4.3 **3 Claims**



1. A device for treating a laser light pulse propagating along an axis, said device comprising:

a polarizer centered on said axis for polarizing said light in a first plane;

an optical quarter wave plate centered on said axis and downstream of said polarizer for transforming the light transmitted by said polarizer into a circularly polarized light;

a plurality of semi-transparent mirrors centered on said axis and downstream of said optical quarter wave plate for sending a part of said circularly polarized light back to said optical quarter wave plate and to allow the other part to pass therethrough, so that after the crossing of that plate, that part of the light sent back to the plate is transformed into a light polarized in a second plane perpendicular to said first plane, said polarizer being capable of reflecting the polarized light in the second plane out of said axis; and

a reflector centered on said axis and downstream of said plurality of transparent mirrors for totally reflecting said light for sending back to said plurality of semi-transparent mirrors said other part of the light.

4,006,427

AUTOMATIC GAIN CONTROL CIRCUIT

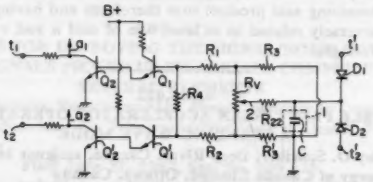
Masao Nishikawa, Nagoya, Japan, assignor to Shin-Shirasuna Electric Corporation, Japan

Filed Apr. 2, 1976, Ser. No. 673,045

Claims priority, application Japan, Aug. 22, 1975, 50-101802

Int. Cl.² H03G 3/30

U.S. Cl. 330—29 **2 Claims**



1. An automatic gain control circuit for recording systems or the like including two channels, wherein first and second variable impedance circuits each comprising at least one transistor are associated with said two channels respectively so that the gains of the respective channels can be controlled by changing the impedances of said variable impedance circuits in accordance with the base currents of said transistors, characterized in that a correcting variable resistor provided with a movable contact is connected at the opposite ends thereof to the bases of the transistors constituting said first and second variable impedance circuits respectively, said movable

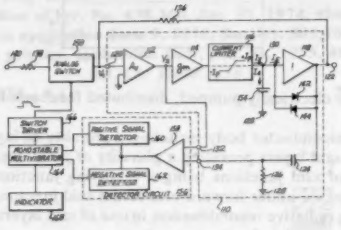
contact being connected to one terminal of a control signal source the other end of which is connected to the opposite ends of said correcting variable resistor through a first shunt resistor and second shunt resistor respectively, and that a coupling resistor is connected between the bases of said transistors.

4,006,428

AMPLIFIER CIRCUIT HAVING INTEGRAL MEANS FOR DETECTING AND PREVENTING NON-LINEAR OPERATION

Donald G. Meyer, Mountlake Terrace, and James E. Fancher, Edmonds, both of Wash., assignors to John Fluke Mfg. Co., Inc., Mountlake Terrace, Wash.

Filed Jan. 8, 1976, Ser. No. 647,407
Int. Cl.² H03F 1/14
U.S. Cl. 330—51 **21 Claims**



1. An amplifier circuit having an input terminal for receiving electrical signals, an output terminal for supplying the signal produced by said amplifier circuit and means including first and second detection terminals operable for supplying a signal indicative of non-linear operation of said amplifier circuit comprising:

first amplification means, having an output terminal and an input terminal connected to said amplifier input terminal;

means for supplying a signal to said first detection terminal that is proportional to the signal applied to said amplifier circuit input terminal;

voltage-to-current converter means for supplying a current proportional to the output signal voltage at said output terminal of said first amplification means;

current limiter means having an input terminal and responsive to the current supplied by said voltage-to-current converter means, said current limiter means having an output terminal and operable for supplying a first predetermined positive current when said current supplied by said voltage-to-current converter means is positive and of a magnitude that exceeds a predetermined value, and for supplying a second predetermined negative current when said current supplied by said voltage-to-current converter means is negative and of a magnitude that exceeds a predetermined value;

circuit means including a first capacitor, said circuit means connected between the output terminal of said current limiter means and a terminal of fixed potential;

second amplification means having an input terminal connected to said output terminal of said current limiter means, and an output terminal connected to said amplifier circuit output terminal, said second amplification means altering the current flow through said capacitor of said circuit means when said second amplification means operates nonlinearly; and

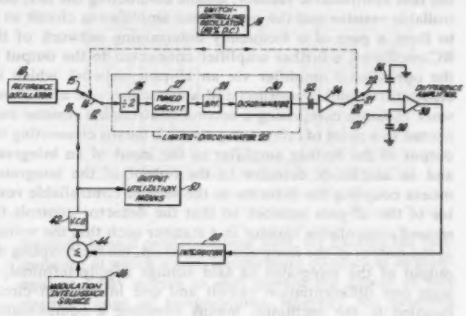
means responsive to the current flow through said first capacitor of said circuit means for supplying a signal to said second detection terminal that is proportional to said current flow through said capacitor.

4,006,429

HOMODYNE AUTOMATIC FREQUENCY CONTROL CIRCUIT

Daniel B. Talbot, Cornwell Heights, Pa., assignor to Jerrold Electronics Corporation, Horsham, Pa.

Filed Sept. 26, 1975, Ser. No. 617,143
Int. Cl.² H03B 3/10; H03C 3/00
U.S. Cl. 331—14 **1 Claim**



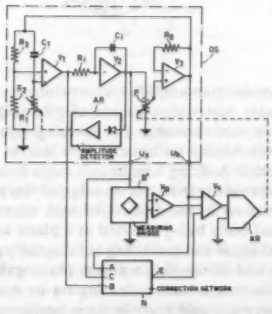
1. In combination, a reference oscillator, a controlled oscillator having an output port and a control port, a difference amplifier having first and second input ports and an output port connected to said control port of said controlled oscillator, first and second storage means connected to said first and second input terminals of said difference amplifier, frequency-to-voltage converter means, first controlled switching means for alternately connecting the input of said frequency-to-voltage converter means to said reference oscillator and to the output of said controlled oscillator, and second switching means operable in synchronization with said first switching means for alternately connecting the output of said frequency-to-voltage converter means to said first and second storage means, wherein said frequency-to-voltage converter means comprises a discriminator, and wherein said frequency-to-voltage converter means further comprises the cascaded connection of a frequency divider, tuned circuit, and band pass filter.

4,006,430

CIRCUIT ARRANGEMENT FOR CONVERTING A BRIDGE UNBALANCE INTO A FREQUENCY VARIATION

Dietrich Meyer-Ebrecht, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 8, 1975, Ser. No. 594,115
Claims priority, application Germany, July 10, 1974, 2433080
Int. Cl.² G01R 27/02; H03B 5/20
U.S. Cl. 331—65 **15 Claims**



1. A circuit for the conversion of an unbalance of a resistor

bridge into a frequency variation of an RC-oscillator which is proportional thereto comprising, a resistor bridge having input terminals coupled to a voltage supply terminal of the RC-oscillator, means connecting the output terminals of the bridge to the input terminals of a compensation amplifier, a first controllable resistor controlled by the output voltage of the compensation amplifier, a negative feedback operational amplifier having an input connected to the voltage supply terminal via the first controllable resistor, means connecting the first controllable resistor and the operational amplifier in circuit so as to form a part of a frequency determining network of the RC-oscillator, a further amplifier connected to the output of the operational amplifier via an all-pass network which includes three ohmic resistors and a capacitor, one of said network resistors comprising a second controllable resistor connected to a point of reference potential, means connecting the output of the further amplifier to the input of an integrator and an amplitude detector to the output of the integrator, means coupling the detector to the second controllable resistor of the all-pass network so that the detector controls the second controllable resistor in a manner such that the voltage at the output of the integrator is constant, means coupling the output of the integrator to said voltage supply terminal, at least one differentiation circuit and one integration circuit coupled to the oscillator, means coupling a compensation voltage developed at the output of the negative feedback operational amplifier to the input of the compensation amplifier, and means coupling the output voltages of the differentiation and integration circuits to the input of the compensation amplifier so as to be superimposed on the compensation voltage.

4,006,431

OPTICAL MOLECULAR AMPLIFIER

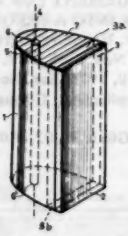
Dieter Röss, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 315,548, Dec. 15, 1972, abandoned, which is a continuation of Ser. No. 162,707, July 14, 1971, abandoned, which is a continuation of Ser. No. 806,043, March 7, 1969, abandoned, which is a continuation of Ser. No. 329,462, Dec. 10, 1963, abandoned. This application Oct. 12, 1973, Ser. No. 405,789

Claims priority, application Germany, Dec. 14, 1962, 82866

Int. Cl.² H01S *3/092*

U.S. Cl. 331—94.5 P **1 Claim**



1. A molecular amplifier comprising a body of optically stimulatable material, a source of pumping light, a reflector device for concentrating the pumping light onto said body, said device having an open hollow mirror of a non-circular cross-section defining a main axis and a focal locus spaced on said axis inwardly from the opening of the mirror, said source being situated in the hollow of said mirror near said focal locus, said body being situated at a plane axially spaced from said focal locus and extending substantially perpendicularly to said axis and comprising a planar plate sealing the opening of the hollow mirror and reflecting on its outside surface, said light source and said body being in positions at which substantially all available light energy from said light source is supplied to said body, and said device having a planar mirror covering the opening of said hollow mirror and extending substantially in a plane perpendicular to said axis, and output means coupled to said body for deriving energy therefrom.

4,006,432

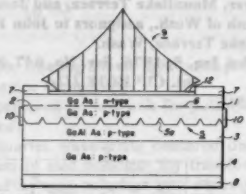
INTEGRATED GRATING OUTPUT COUPLER IN DIODE LASERS

William Streifer, Palo Alto; Donald R. Scifres, Los Altos, and Robert D. Burnham, Los Altos Hills, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 15, 1974, Ser. No. 515,120

Int. Cl.² H01S *3/19, 3/081*

U.S. Cl. 331—94.5 C **2 Claims**



2. An electrically pumped, distributed feedback laser comprising:

a semiconductor body including a plurality of layers, pairs of said layers providing a plurality of junctions,

one of said junctions being a rectifying junction, carriers injected under forward bias across said juncton undergoing radiative recombination in one of said layers to generate stimulated coherent radiation,

one of said junctions being a non-planar heterojunction, said heterojunction providing a periodic perturbation of refractive index therealong, said perturbation interacting with at last a portion of said radiation to cause said radiation to be reflected by said periodic perturbation, said perturbation having a period equal to an integer number of wavelengths of said coherent radiation such that said reflected radiation is in phase and a portion of said coherent light exits said laser body at an angle to the plane of said rectifying junction, and

substantially 100% light reflecting means on sides of said active region layer perpendicular to said rectifying junction and non-light reflecting means on a surface of said body parallel to said rectifying junction.

4,006,433

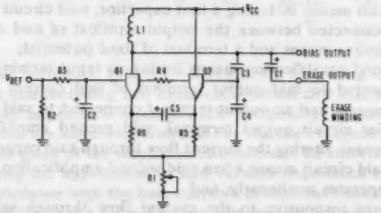
BIAS/ERASE OSCILLATOR

Alan Frank Higginbotham, and Kenneth Layton Jeffries, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,576

Int. Cl.² H03B *5/12*

U.S. Cl. 331—117 R **5 Claims**



1. An oscillator for providing low distortion sinusoidal sig-

nals for bias and erase in a battery operated magnetic recording apparatus, said oscillator comprising:

a. tank means for determining oscillation frequency, said tank means including an inductance comprising an erase winding, and a capacitive voltage divider comprising a combination of first and second capacitors connected in series with said inductance, said tank means having an output derived from between said first and second capacitors; and

b. a differential pair of first and second transistors with said output of said tank means connected to the base of said first transistor, and an input to said tank means connected to the collector of said second transistor from between said first and second capacitors, and said inductance.

4,006,434

MICROSTRIP CIRCULATOR OPERATING IN THE PERIPHERAL MODE AND HAVING NON-UNIFORM BIASING MEANS

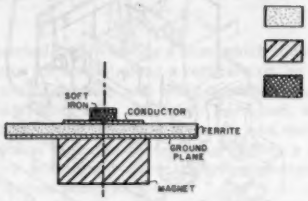
Pietro De Santis, and Fioravante Pucci, both of Rome, Italy, assignors to Selenia-Industrie Elettroniche Associate S.p.A., Rome, Italy

Continuation of Ser. No. 438,364, Jan. 31, 1974, abandoned. This application June 9, 1975, Ser. No. 585,189

Claims priority, application Italy, Jan. 31, 1973, 48000/73

Int. Cl.² H01P *1/38*

U.S. Cl. 333—1.1 **3 Claims**



1. A micro-wave multigate planar circulator coordinating the TEM (Transverse Electro-Magnetic) and the peripheral modes of wave propagation, comprising:

a member of ferro-magnetic material of substantially planar configuration and having a spatially non-uniform distribution of effective permeability;

a micro-strip conductor disposed on one side of said member, and formed of a layer of conducting material and having the configuration of a central body and at least three tapered arms extending from said body for connection to external transmission lines;

a ground planar conductor disposed on the opposite side of said member; and

means for producing non-uniform magnetic biasing disposed on one side of said ground planar conductor for effecting said spatially non-uniform distribution of effective permeability of said member and producing magnetic tapering zones in said body and extending arms.

4,006,435

METHOD FOR FABRICATING A TEMPERATURE COMPENSATED SURFACE WAVE DEVICE

Sheldon J. Kerbel, Merrick, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Division of Ser. No. 535,890, Dec. 23, 1974. This application Feb. 9, 1976, Ser. No. 656,476

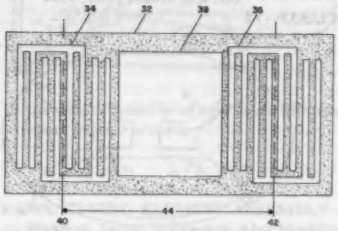
Int. Cl.² H03H *9/26, 9/30, 9/32;* **H01L** *41/18*

U.S. Cl. 333—30 R **1 Claim**

1. A method for fabricating an acoustic surface wave device having an acceptable coefficient of propagation delay over a desired range of operating temperatures using a piezoelectric substrate which exhibits a substantial variation of propagation delay with temperature over said desired range, comprising:

depositing on said substrate transducer means, responsive to applied electric signals, for causing acoustic surface wave to propagate along a predetermined path on said substrate;

depositing on said substrate a conductive material having a selected thickness and selected area and disposed at least



partially in said predetermined path, for causing the temperature at which a zero temperature coefficient of propagation delay occurs to shift toward the center of said desired range of temperatures, whereby the resulting acoustic surface wave device has substantially less variation of propagation delay with temperature over said range than said substrate alone.

4,006,436

SURFACE ACOUSTIC WAVE DELAY LINES

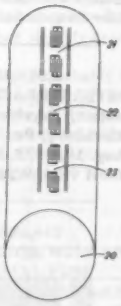
John Stuart Heeks, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,926

Claims priority, application United Kingdom, May 20, 1975, 21462/75

Int. Cl.³ H03H *9/26, 9/30, 9/32;* **H01L** *41/10*

U.S. Cl. 333—30 R **12 Claims**



1. A surface acoustic wave delay line comprising;

a cylindrical body of piezoelectric material;

a pair of separate input and output transducers arranged on the surface of said cylindrical body and adjacent one another on a straight line parallel to the cylindrical axis, said transducers being so oriented that the propagation paths associated therewith are normal to said straight line; and

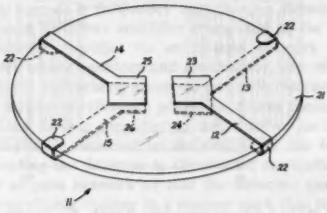
two directional coupler devices each having a predetermined coupling coefficient located on either side of said pair of transducers so as to provide mutual coupling between acoustic waves in both propagation paths associated with said transducers.

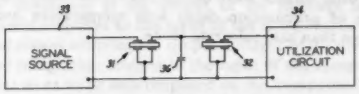
4,006,437

FREQUENCY FILTER

Harold A. Simpson, North Andover, Mass., and Edwin C. Thompson, West Epping, N.H., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J. and Western Electric Company, Inc., New York, N.Y.

Filed June 27, 1975, Ser. No. 590,901
Int. Cl.² H03H *7/08, 9/02*
U.S. Cl. 333—72 **3 Claims**





1. A frequency band-pass filter which comprises:

at least two electromechanical crystal devices having metallic electrodes formed on opposite sides of separate crystal wafers, said crystal devices being capacitively coupled in cascade relationship;

at least two of said electromechanical crystal devices being formed on respective ones of the crystal wafers of different thicknesses so that said crystal devices have fundamental frequency bands which are different from one another; and

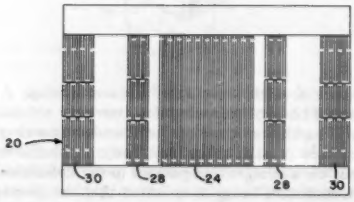
each of said electromechanical crystal devices having one overtone frequency band that is coincident with one overtone frequency band of each of the other electromechanical crystal devices so that said crystal devices pass only the coincident overtone frequency band while suppressing all other frequencies.

4,006,438

ELECTRO-ACOUSTIC SURFACE-WAVE FILTER DEVICE

Glenn Edward Bennett, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 18, 1975, Ser. No. 605,584
Int. Cl.² H03H *9/04, 9/26, 9/32;* H01L *41/10*
U.S. Cl. 333—72 **15 Claims**



1. A transducer for an electro-acoustic surface-wave device, said transducer having center frequency f_o, and a frequency domain spectral response, $H(f)$, which has a time domain impulse response, $h(t)$, including:

a. a central group of interdigitated fingers, taken separately producing a central pulse having a Fourier transform with maximum near f_o and a frequency bandwidth B between the two null response points closest to f_o; and

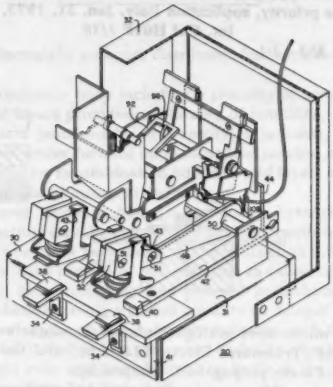
b. a first pair of flanking finger groups producing pulses spaced approximately 1.5/B from the center of said central pulse, the energy in each pulse of said pairs of flanking pulses being a predetermined fraction less than one of the energy in said central pulse.

4,006,439

CIRCUIT INTERRUPTER HAVING AN INSULATED BRIDGING CONTACT

Raymond E. Wien, Penn Township; Eugene H. Seidling, Monroeville, and Nicholas A. Tomasic, Plum Boro, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,608
Int. Cl.² H01H *83/00*
U.S. Cl. 335—15 **15 Claims**



1. A circuit interrupter comprising:

a first stationary contact;

a second stationary contact separated from said first stationary contact;

bridging contact means;

an elongated contact arm, having said bridging contact means connected thereto, pivotal about an axis between a closed position wherein said bridging contact means completes an electric circuit between said first stationary contact and said second stationary contact and an open position wherein said bridging contact means is spaced apart from said first stationary contact and said second stationary contact;

insulating means connected to the free end of said elongated contact arm disposed between said elongated contact arm and said bridging contact means to support said bridging contact means in an insulating relationship from said elongated contact arm;

primary latch means connected to said elongated contact arm having a latching position latching said elongated contact arm in the closed position;

a secondary latch having a latched position keeping said primary latch means in the latching position; and,

bimetal actuating means responsive to current flow for unlatching said secondary latch when current flow through the circuit interrupter exceeds a trip level for a predetermined period of time whereby said primary latch is released and said elongated contact arm can move to the open position.

4,006,440

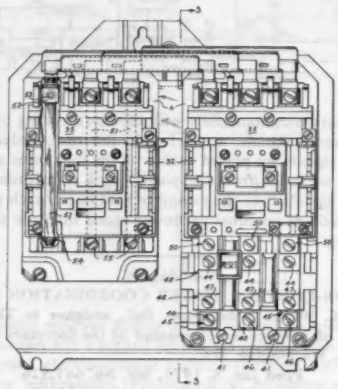
TERMINAL STRUCTURE FOR ELECTROMAGNETIC CONTACTOR

Lawrence A. Burton, Oconomowoc; Peter Heuser, Hales Corners; Marquis B. Robinson, Milwaukee; Dennis Trendel, Mukwonago, and Donald V. Zunft, Greendale, all of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed July 21, 1975, Ser. No. 597,555

Int. Cl.² H01H *50/04*

U.S. Cl. 335—132 **2 Claims**



1. In an electrical switch having a base which slidably supports an actuator for motion along a vertical axis, an electromagnet mounted to the base and being operable to slide the actuator upward along said axis when energized, a set of movable contacts mounted to said actuator, and two sets of stationary contacts mounted to said base within a contact enclosure which is disposed above said electromagnet, the improvement therein comprising:

a set of contactor input terminals mounted to said contact enclosure and electrically connected to one of said sets of stationary contacts;

a first set of contactor output terminals mounted to said contact enclosure and electrically connected to the other set of stationary contacts;

a second set of contactor output terminals mounted to said base and disposed beneath said electromagnet;

a set of bus bars mounted to said base and electrically connected to said second set of stationary contacts and said other set of contactor output terminals, said bus bars extending downward from their connection with said stationary contacts behind said electromagnet; and

a set of overload relays mounted beneath the base and connected directly to said second set of contactor output terminals.

4,006,441

PEDAL-OPERATED VOLUME CONTROL

Philip C. Goodrich, 12571 Lincoln St., Grand Haven, Mich. 49417

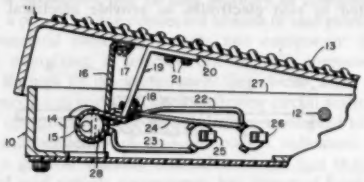
Filed Dec. 24, 1975, Ser. No. 644,181

Int. Cl.² H01C *10/00*

U.S. Cl. 338—153 **4 Claims**

1. A controller for an electrical circuit, said controller including a frame, an actuator moveably mounted on said frame, rotary potentiometer means having a control shaft and secured to said frame, and cable means operably associating said actuator and said potentiometer whereby movement of said actuator induces rotation of said potentiometer shaft, wherein the improvement comprises:

sheave means secured to said control shaft, said sheave means having a hole receiving said control shaft, and having a peripheral cable-receiving surface disposed at a varying radius from the axis of said hole providing a



gradient to the rate of rotation of said shaft with respect to the movement of said actuator.

4,006,442

ELECTRONIC TUNING ELEMENT ASSEMBLY

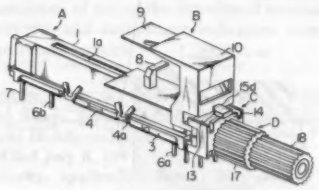
Yasunori Mega, Wakuya, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Sept. 11, 1975, Ser. No. 612,496

Claims priority, application Japan, Sept. 17, 1974, 49-111887

Int. Cl.² H01C *10/50*

U.S. Cl. 338—180 **10 Claims**



1. An electronic tuning element assembly comprising, in combination:

a variable tuning resistor having a straight resistance element with contacts at the ends thereof, a slider linearly movable along the resistance element and a threaded shaft screwably extending through the slider so that rotation of the shaft causes linear movement of the slider, a flexible ribbon connected at one end to the slider and a guide member, the ribbon slidably extending through the guide member; and

a rotary tuning band switch detachably fixed to the guide member, the shaft extending through the switch coaxially therewith, the switch having a rotary control member, a movable contact fixed for rotation with the rotary control member and a plurality of fixed contacts with which the movable contact is engageable.

4,006,443

COMPOSITION RESISTOR WITH AN INTEGRAL THERMAL FUSE

Allan V. Kouchich, Milwaukee, and Robert Marshall, Mequon, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

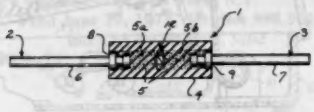
Filed Sept. 11, 1975, Ser. No. 612,313

Int. Cl.² H01C *13/00*

U.S. Cl. 338—215 **15 Claims**

1. In a resistor having a sleeve made of an electrically insulating material which is filled with a carbon composition resistance material and having a pair of terminal electrodes disposed at its ends to provide a conductive path therebetween through the resistance material, the improvement therein comprising a thermal fuse insert which is disposed within said sleeve and within the conductive path formed by said resistance material, said thermal fuse insert including: a substrate made of an electrically insulating material; a pair of electrodes

disposed on opposite sides of said substrate; a through path formed in said substrate between said electrodes; and a fuse link disposed within said through path and electrically connected to said electrodes to provide electrical continuity



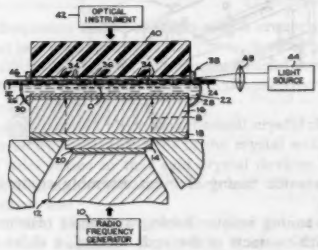
therebetween at normal operating temperatures, said fuse link being responsive to the heat generated by the resistance material when current flows therethrough to open circuit when a predetermined temperature is reached.

4,006,444

ACOUSTIC IMAGING APPARATUS

Calvin F. Quate, Los Altos Hill, and James A. Cunningham, Redondo Beach, both of Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Feb. 12, 1974, Ser. No. 441,802
Int. Cl.² H04B *11/00*
U.S. Cl. 340—15 **1 Claim**



1. Acoustic imaging apparatus which comprises
means for generating an acoustic wave beam along a predetermined path,
means supporting an object to be imaged in said acoustic beam path,
a plurality of visible particles suspended throughout a fluid medium for displacement in the beam path beyond the object in proportion to the intensity of radiation pressure resultant from the acoustic energy,
said particles being suspended in a thin layer of liquid disposed between enclosing layers of material whose optical indices of refraction are less than that of the suspending liquid, to define an optical waveguide and
means for directing light through said liquid layer between said enclosing material layers,
whereby essentially only light reflected from said particles will form an optical image of said object.

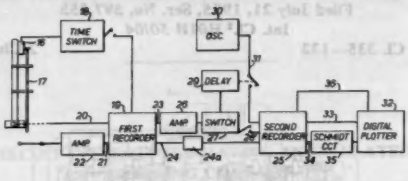
4,006,445

APPARATUS FOR AND METHODS OF SEISMIC PROSPECTING

Mark Ian Howell, Bristol, England, assignor to Electrolocation Limited, Bristol, England

Filed Nov. 3, 1975, Ser. No. 628,429
Int. Cl.² G01V *1/26*
U.S. Cl. 340—15.5 TC **16 Claims**

1. A method of seismic prospection wherein the subterranean response from a single generated impulse is recorded into two channels the first channel providing datum information, i.e., a signal corresponding to said impulse, and the second channel providing signals corresponding to reflections of said impulse, wherein the played back second channel signals are re-recorded in a continuation of the second channel, and the played back impulse signal from the first channel is used to initiate said re-recording and switch into a continuation of the first channel a continuous tone which is recorded as



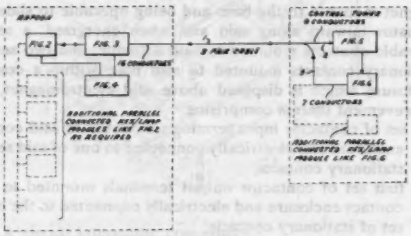
a tone burst simultaneously with the re-recording of the second channel signals, and wherein the re-recorded second channel signals are played back with the tone burst and visual tracings are made from the played back re-recorded second channel signals over the period of said burst, each play back being made at an equal or slower speed than the associated recording.

4,006,446

RAPCON-CONTROL TOWER COORDINATION SYSTEM

James K. White, Wilmington, Del., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,526
Int. Cl.² G08G *1/12*; G08B *25/00*
U.S. Cl. 340—23 **6 Claims**



1. A system for communication between the RAPCON and the control tower at an airport based on visual indications, said system comprising: a transmission link between the RAPCON and the control tower; like keyboards at the RAPCON and the control tower, each keyboard having like primary and secondary rows of three illuminable keys color coded C_1, C_2, and C_3, C_2 being the color of the central key; means responsive to the actuation of any primary or secondary key at the RAPCON to produce a flashing illumination of that key and the corresponding key at the control tower; means responsive to actuation of the said corresponding key at the control tower to steady the illumination of both keys; means operative during flashing or steady illumination of said keys to prevent cancellation of the illumination by further actuation of said corresponding key at the control tower; means responsive to the reactuation of any illuminated key at the RAPCON to cancel the illumination of that key and the corresponding key at the control tower; means responsive to actuation of a primary or secondary key of color C_2 at the RAPCON to cancel the illumination of the primary key of color C_1 at both the RAPCON and the control tower; means responsive to the actuation of the primary or secondary key of color C_3 at the RAPCON to cancel the illumination of the primary key of color C_3 at both the RAPCON and the control tower; and means responsive to cancellation of the illumination of any primary key to transfer the illumination status of the secondary key of the same color to the primary key.

4,006,447
AUDIBILITY-CONTROL SYSTEM FOR RADIO RECEIVER

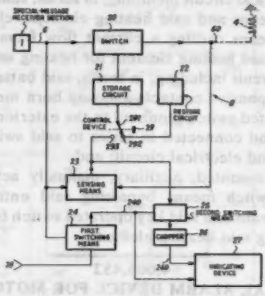
Jean-Raymond Narbaits-Jaureguy, and Henri Billottet, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed June 12, 1974, Ser. No. 478,681

Claims priority, application France, June 14, 1973, 73.21705

Int. Cl.² G08G 1/00

U.S. Cl. 340—33 **19 Claims**



1. In a radio receiver having a first section for picking up special messages and a second section for picking up a normal radio program, electroacoustic transducer means for audibly reproducing information represented by incoming electromagnetic signals, and changeover means with a first position and a second position for connecting said transducer means to said first and said second section, respectively, the combination therewith of sensing means connected to said first section for detecting the presence of incoming special message signals, and indicator means independent of said transducer means controlled by said sensing means and by said changeover means for revealing the arival of said special message signals in said second position of said changeover means.

4,006,448
CENTRALIZED MONITOR SYSTEM FOR MOTOR VEHICLES

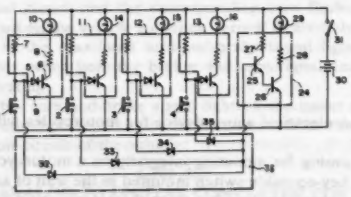
Hiroshi Arai, and Jun Ohta, both of Aichi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 19, 1975, Ser. No. 578,964

Claims priority, application Japan, Jan. 14, 1975, 50-6592

Int. Cl.² B60Q 1/00

U.S. Cl. 340—52 F **8 Claims**



1. A centralized monitor system for motor vehicles comprising a plurality of sensors which are applied respectively to a plurality of vehicle components for individually monitoring the operating conditions of said plurality of vehicle components respectively, each of said sensors being operative to assume a first operating state when its associated vehicle component is in a predetermined normal operating condition and being operative to assume a second operating state when the operating condition of said component departs from said predetermined normal operating condition, a plurality of indicators one for each of said components being monitored, a plurality of switching circuits each of which has an input that is connected to a respective one of said plurality of sensors and an output that is connected to a respective one of said plurality of component indicators, a power source connected to each of said plurality of interconnected switching circuits and component indicators for energizing a selected one of said component indicators through its associated switching circuit when the sensor connected to said associated switching circuit assumes its second operating state, a further indicator adapted to be energized independently of said component indicators for providing a general warning indicative of the fact that at least one of said vehicle components has departed from its normal operating condition, a further switching circuit for selectively connecting said further indicator to said power source, and control means for controlling the operating state of said further switching circuit thereby to control the energization of said further indicator, said control means comprising an OR circuit having a plurality of input terminals and a single output terminal, said single output terminal being connected to said further switching circuit, and said plurality input terminals being connected respectively to said plurality of sensors at the input sides of said plurality of switching circuits whereby the signal state at each of said input terminals and at said single output terminal is directly dependent upon the operating state of each sensor connected to each of said input terminals and is independent of the operating conditions of any of the plurality of interconnected switching circuits and component indicators respectively associated with said sensors.

4,006,449
INFORMATION DETECTOR FOR A TIRE WHEEL

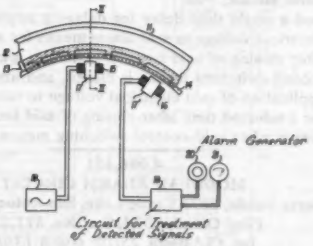
Momoki Sumi, Tokyo, Japan, assignor to Momoki Sumi, Tokyo and Shunichi Hishikawa, Kobe, both of, Japan

Filed July 8, 1975, Ser. No. 594,050

Claims priority, application Japan, July 12, 1974, 49-82455[U]

Int. Cl.² B60C 23/02

U.S. Cl. 340—58 **12 Claims**



1. An information detector for a tire wheel comprising:

at least one coil mounted for rotation and being coiled about the circumference of the wheel, said coil being formed by parallel portions in a conductor which are doubled back so that said parallel portions are adjacent one another but are separated by a uniform space extending about the circumference of the wheel, said parallel portions on opposite sides of said space normally con ducting in opposite directions;

a detection means connected to said coil for rotation and arranged to vary electric conductivity of said coil for rotation in accordance with a parameter of the wheel;

two fixed separate coils opposed in a gap to the parallel portions of said coil for rotation, the first of which is for electromagnetic coupling a signal to the coil for rotation and the second of which is for detecting the signal via electromagnetic coupling, with said coil for rotation, said fixed separate coils being positioned in close relation to said parallel portions and oriented such that their axes extend substantially through said uniform space;

an oscillator arranged to supply said signals connected to

the first fixed coil; and

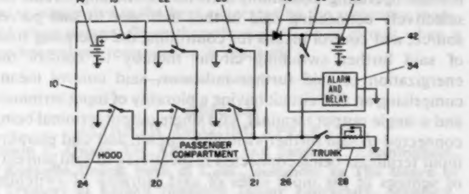
an indicating means having a circuit connected to the second fixed coil for treatment of the signal detected by said second fixed coil.

4,006,450

VEHICLE BURGLAR ALARM WITH INTERIOR CONTROL SWITCH

Gerd Ofenleger, Pleasant Acres, East Waterboro, Maine 04030

Filed Oct. 8, 1974, Ser. No. 513,103
Int. Cl.² B60R *25/10*
U.S. Cl. 340—63 8 Claims



1. A vehicle burglar alarm system, usable in a vehicle having a passenger compartment and at least one non-passenger compartment, comprising:

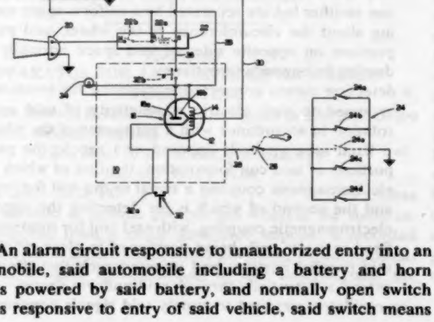
1. an alarm circuit, comprising:
   a. alarm means, responsive to an applied electrical voltage, for signalling an alarm;
   b. means for supplying said electrical voltage;
   c. first switching means, responsive to the opening of said passenger compartment, for applying said electrical voltage to said alarm signalling means; and
   d. second switching means, closed in response to the opening of said non-passenger compartment, for applying said electrical voltage to said alarm signalling means when closed;
2. control switching means located in said non-passenger compartment, for selectively opening or closing said alarm circuit;
3. and a single time delay for delaying application of said electrical voltage to said alarm means for a selected time after closing of said control switching means when said second switching means is closed, and also for delaying application of said electrical voltage to said alarm means for a selected time after closing of said second switching means when said control switching means is closed.

4,006,451

MODULAR ALARM CIRCUIT

Humberto Nobile, 5875 Castle Lake, San Antonio, Tex. 78218

Filed Oct. 3, 1974, Ser. No. 511,527
Int. Cl.² B60R *25/10;* G08B *13/08*
U.S. Cl. 340—63 5 Claims



1. An alarm circuit responsive to unauthorized entry into an automobile, said automobile including a battery and horn means powered by said battery, and normally open switch means responsive to entry of said vehicle, said switch means being mounted to be responsive to an opening of an access member of the automobile, comprising:

a thermostatic relay including an electrical heating element and a set of normally open thermally responsive contacts, said contacts closing in a first period of time in response to heat generated by said heating element when said element is electrically energized, said contacts having sufficient thermal retention to remain closed for a second period of time greater than said first period of time after said element is de-energized;

a first electrical circuit including, in series, said battery, said switch means and said heating element, closing of said switch means causing a current flow from said battery through said heating element for heating said element;

a second circuit including, in series, said battery, said thermally responsive contacts and said horn means;

a key operated switch mounted to the exterior of said automobile and connected in series to said switch means in said second electrical circuit; and

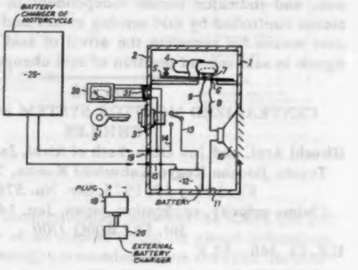
dashboard mounted, auxiliary, manually activated push-button switch means bypassing said entry responsive switch means and said key operated switch for electrically energizing said heating element.

4,006,452

ELECTRICAL ALARM DEVICE FOR MOTORCYCLES

Pierre Giacino, 91 Boulevard Longchamps, Marseille 1, France

Filed Oct. 7, 1974, Ser. No. 512,508
Claims priority, application France, Oct. 12, 1973, 73.36966
Int. Cl.² B60R *25/10*
U.S. Cl. 340—65 3 Claims



1. An electrical alarm device for motorcycles which comprises:

a. a casing for mounting integrally on a motorcycle
b. a key-operable switch mounted in the wall of said casing for operation by a key from the exterior, said key-operable switch having a first operable state and a second alternative operable state
c. a mercury tilt switch mounted in said casing and positioned for non-completion of its circuit when the casing is tilted, and for completion of its circuit when the casing is upright,
d. an electric battery disposed in said casing,
e. an electrically operable alarm in said casing,
f. a two-pole current outlet in the wall of said casing, said key-operable switch in said first operable state completing a circuit including said battery, said tilt switch and said electric alarm, said key-operable switch in said second operable state completing a circuit from said battery to said two-pole current outlet.

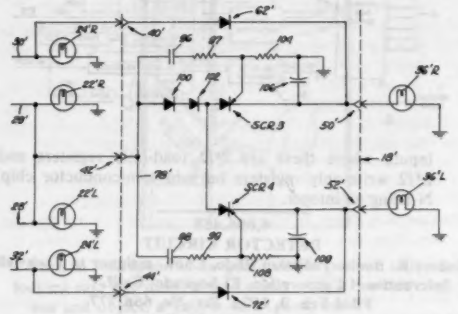
4,006,453
DUAL DIRECTIONAL AND BRAKE LIGHT CONTROL FOR TRAILERS

Richard C. Bryant, 5017 Wheeler, LaVerne, Calif. 91750

Continuation-in-part of Ser. No. 510,791, Sept. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 341,628, March 14, 1973, abandoned. This application Aug. 21, 1975, Ser. No. 606,704

Int. Cl.[2] B60Q *1/38*

U.S. Cl. 340—67 **8 Claims**



1. A device for adapting combined brake- and turn-signal lights of a trailer to independent brake-signal and turn-signal lights on an associated towing vehicle, said towing vehicle having right- and left-turn flasher signal circuits and a brake-signal circuit, said trailer having right-hand and left-hand signal lights, each of which has a common filament for brake- and turn-signals, said device comprising:

first switching means connected to both said right-turn flasher signal circuit and said brake-signal circuit on the vehicle, and also connected to said right-hand turn-and-brake signal light on the trailer;

second switching means connected to both said left-turn flasher signal circuit and to said brake-signal circuit on the vehicle, and also connected to said left-hand turn-and-brake signal light on the trailer;

each of said switching means being operable to transmit current from the corresponding turn flasher signal circuit or the brake signal circuit of the towing vehicle to the associated turn-and-brake signal light on the trailer when only one of said signal circuits on the vehicle is operating; and

each of said switching means being operable, responsive to the combined electrical current from both the brake signal circuit and the corresponding turn flasher signal circuit on the vehicle to switch current alternately on and off to the associated turn-and-brake signal light of the trailer, when both the brakes and turn signal flasher are operating;

the other turn-and-brake signal light on the trailer remaining continuously illuminated by current from the brake-signal circuit of the vehicle.

4,006,454
ANALOG TO DIGITAL CONVERTER FOR ASYNCHRONOUS DETECTOR

Kermit Myles Beseke, Schaumburg; James Robert Johannsen, Hanover Park, and Ronald Howard Chapman, Wheaton, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

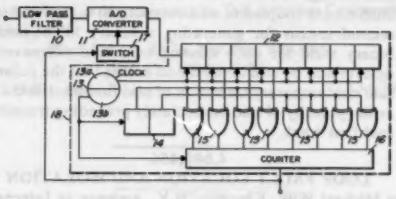
Filed May 7, 1975, Ser. No. 575,301

Int. Cl.[2] H03K *5/18*; **G08C** *25/00*; **H03K** *5/13*

U.S. Cl. 340—146.1 R **19 Claims**

1. In combination with an asynchronous detector for detecting a particular digital word within a train of signals wherein the train of signals includes bits, each bit having a predetermined period, and the detector samples each bit a plurality of times, compares the samples to a stored predetermined word and provides a comparison signal in response to a predetermined number of correlations between the samples and the stored word, an analog to digital converter comprising:

a. signal conditioning means having input means for receiving analog signals, output means coupled to the detector and having first and second modes of operation, for converting the received analog signals to digital signals in both modes of operation and inserting periodic error pulses in the digital signals when a digital pulse extends beyond a predetermined time in the first mode of operation; and



b. switch means coupled to said signal conditioning means for switching said signal conditioning means between the first and second modes of operation, said switch means including input means coupled to the detector for receiving the comparison signal therefrom and switching said signal conditioning means from the first to the second mode of operation in response thereto.

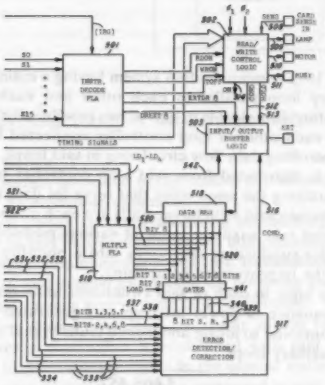
4,006,455
ERROR CORRECTION SYSTEM IN A PROGRAMMABLE CALCULATOR

Stephen P. Hamilton, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 10, 1975, Ser. No. 622,288

Int. Cl.[2] G06K *5/00*

U.S. Cl. 340—146.1 F **10 Claims**



1. In a system for reading binary data from a recorded storage media wherein said binary data is stored on a pair of tracks of said storage media with transitions of alternating polarity being stored on a first of said tracks indicative of a first binary state and transitions of alternating polarity being stored on the second of said tracks indicative of a second binary state, an error correction system comprising:

a. signal receiving means for separately receiving the polarities of the transitions recorded on said first and second tracks;

b. first means coupled to said signal receiving means for generating a binary bit for each recorded transition, the state of said bit being set to said first binary state for each transition received from said first track and to said second binary state for each transition received from said second track;

c. second means coupled to said signal receiving means for

determining each time a transition is missing from both said first and second tracks;

d. storage means for storing the polarity of each transition immediately preceding a contemporarily received transition on said first track;

e. comparison means coupled to said signal receiving means and to said storage means for comparing the contemporarily received transition on said first track with the polarity of the immediately preceding transition stored in said storage means; and

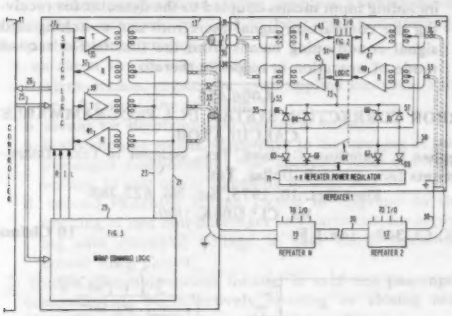
f. third means coupled to said comparison means and to said second means for generating a binary bit of said first binary state for each missing transition whenever it is determined by said comparison means that the polarity of said contemporary transition of said first track is the same as the polarity of said immediately preceding transition of said first track.

4,006,456

LOOP FAULT LOCATION AND ISOLATION

John Michael Wilk, Kingston, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 2, 1976, Ser. No. 646,297
Int. Cl.² G06F *11/04;* H04B *3/46*
U.S. Cl. 340—146.1 R 7 Claims



1. A loop communication system having a main loop and an auxiliary loop parallel to each other and each capable of circulating data signals in one of two possible directions opposite to each other, a loop controller connected to said loops for controlling data flow circulating in said loops, and wherein power is distributed from said loop controller to switchover units utilizing the same wires that serve for data transmission, and wherein said switchover units are each connected to said main and said auxiliary loops at various positions along said loops for subdividing said loops into a plurality of loop sections; the improvement comprising:

wrap logic in each of said switchover units responsive to a sequence of power interruptions generated by said loop controller to locate and isolate faults in said main and said auxiliary loops.

4,006,457

LOGIC CIRCUITRY FOR SELECTION OF DEDICATED REGISTERS

Edward C. Hepworth, Apache Junction; Rodney J. Means, Tempe, both of Ariz., and Charles I. Peddle, Norristown, Pa., assignors to Motorola, Inc., Chicago, Ill.

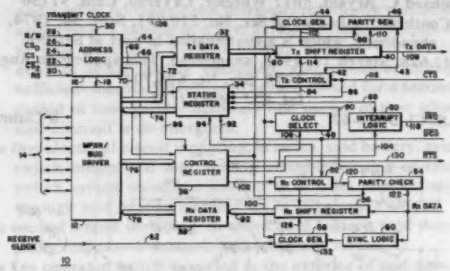
Filed Feb. 18, 1975, Ser. No. 550,338
Int. Cl.² H04Q *9/00;* G11C *17/00;* H04L *5/00*
U.S. Cl. 340—147 R 12 Claims

1. A semiconductor chip having coupled thereto an address bus, a bidirectional data bus, a control input, at least one register selection input, and including a chip decoder logic circuitry coupled to said address bus comprising:

a plurality of read-only registers;

an equal number of write-only registers;

register decode means coupled to said read-only registers and said write-only registers, said chip decoder logic circuitry, said conrol input, and said register selection input or inputs for selecting one of said read-only or write-only registers as a function of logical levels of said control input and of not more than N-1 register selection



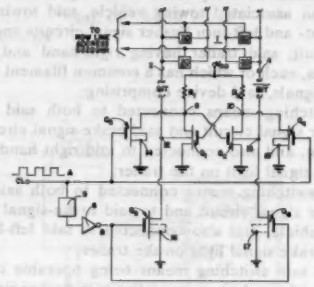
inputs where there are $2^n/2$ read-only registers and $2^n/2$ write-only registers on said semiconductor chip, N being an integer.

4,006,458

DETECTOR CIRCUIT

Robert K. Booher, Mission Viejo, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 9, 1976, Ser. No. 656,777
Int. Cl.² H04Q *3/00*
U.S. Cl. 340—147 R 10 Claims



1. In combination:

information signal source means,

data bus line means connected to receive information signals from said information signal source means,

circuit means adapted to sense said information signals along said data bus lines means, said circuit means including a plurality of multi-terminal semiconductor devices having a body node formed between conduction path terminals thereof, and

means to connect at least some of said body nodes to said data bus line means.

4,006,459

METHOD AND APPARATUS FOR CONTROLLING THE PASSAGE OF PERSONS AND OBJECTS BETWEEN TWO AREAS

Richard H. Baker, and Richard C. Hix, both of Los Altos, Calif., assignors to Mardix, Inc., Mountain View, Calif.

Continuation of Ser. No. 94,229, Dec. 2, 1970, Division of Ser. No. 523,499, Jan. 17, 1966, Pat. No. 3,564,132. This application May 25, 1973, Ser. No. 364,011
The portion of the term of this patent subsequent to Feb. 16, 1988, has been disclaimed.
Int. Cl.² G06K *3/00*
U.S. Cl. 340—149 A 8 Claims

1. The method of controlling the passage of persons between a secured area and an unsecured area through an enclosed space having at least a normally locked door for communicating the space with the secured area and another normally locked door for communicating the space with an unse-

cured area, comprising the steps of:

unlocking one of said doors in response to a person requesting admittance to said space from one of the areas;

electronically examining substantially the entire contents of said space from a time not later than just prior to the closing of said one door to a time not earlier than just after the locking of said one door to determine the presence in said space of an admitted person and object;

locking said one door, after closing, with the admitted person and object, if any, in said space; and

electronically examining at least one characteristic of the person admitted to said space, other than presence and with means other than those used to examine entire contents, to determine the suitability of the examined person to proceed through said space to the other area.

4,006,460

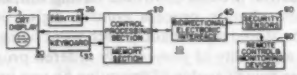
COMPUTER CONTROLLED SECURITY SYSTEM

William D. Hewitt, Owings Mills; Roy S. Diffrient, Reisterstown; Richard A. Bajackson, Cockeysville, and Gerard M. Blair, Towson, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1974, Ser. No. 531,424

Int. Cl.² G08B *23/00*; H04Q *9/00*

U.S. Cl. 340—149 R **4 Claims**



1. In a system including one or more computers adapted to receive and process input signals and generate output signals in accordance with programmed information, the combination of,

a plurality of alarm sensors capable of producing alarm output signals in response to alarm conditions and trouble output signals in response to circuit trouble or tamper conditions,

an electronic circuit means connected between said alarm sensors and a computer, said electronic circuit means including a comparator circuit associated with each of said alarm sensors for comparing the output signals from the alarm sensor to a first threshold indicative of an alarm condition and a second threshold indicative of a trouble or tamper condition and developing output signals indicative thereof, said electronic circuit means storing the output signals produced by said comparator circuits,

control circuit means coupling said electronic circuit means to said computer to gate said output signals of said comparator circuits to said computer as requested by the computer, and

tamper test circuit means operatively connected between said computer and said alarm sensors for applying a tamper test signal from said computer to said alarm sensors to monitor the operational integrity of the alarm sensor circuits as a function of the output signal developed by the comparator circuit as a result of the comparison of the output signal developed by the alarm sensor to said second threshold.

4,006,461

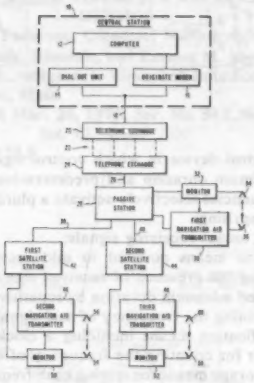
SYSTEM FOR TRANSMITTING OPERATING CONDITION DATA FROM A PASSIVE STATION TO A CENTRAL STATION

J. Roland Coulter, Harrison, and Arthur E. Fuerherm, White Plains, both of N.Y., assignors to Tull Aviation Corporation, Armonk, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,461

Int. Cl.² H04Q *9/00*

U.S. Cl. 340—163 **13 Claims**



1. An operating condition data communication system comprising

a central station,

a passive station dedicated to the control and acquisition of data of an electronic apparatus,

said central station including means for establishing a connection to said passive station over a non-dedicated voice band-width communication link for transmitting commands to said passive station and for receiving responses from said passive station over said connection,

said passive station including processing means operable whenever a connection is established with said central station to issue a ready signal to the central station inviting the central station to issue a command to said passive station,

said processing means being operable for receiving and executing said commands from said central station and for transmitting responses to said commands to said central station,

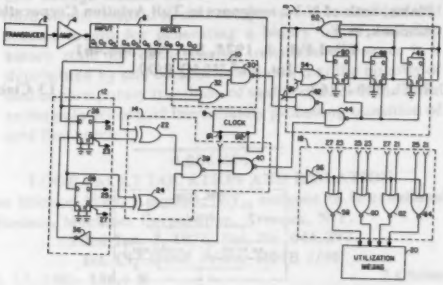
said passive station including a first alarm condition call-out means operable in response to the detection of an alarm condition at said passive station to initiate a call-out operation for establishing communication over a non-dedicated voice band-width communication link to said central station,

the capability of said passive station to establish communication with said central station being limited to the establishment of the connection and the transmission of a ready signal to the central station inviting the central station to issue a command to the passive station.

4,006,462
DIGITAL REMOTE CONTROL SYSTEM WITH SIGNAL VERIFICATION

Robert R. Podowski, Elmhurst, and Johnny Collins, Harvey, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed Mar. 10, 1975, Ser. No. 556,760
Int. Cl.² H04Q 9/16; G06F 11/00
U.S. Cl. 340—168 B **4 Claims**



1. A control device in which control signals of predetermined minimum duration and predetermined different individual frequencies selectively activate a plurality of utilization means, comprising:

receiving means receiving signals;

verification means coupled to said receiving means for verifying the presence of received signals of said predetermined minimum duration by repetitively sampling and determining the frequency of said signals;

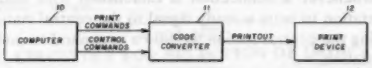
said verification means including a clock controlled first counter for counting the frequency of said received signals, storage means for storing each frequency count, and comparison means for comparing each frequency count with the immediately preceding frequency count; and

decoding means coupled between said verification means and said utilization means and responsive to a first predetermined number of verified samples of said received signal for selectively activating said utilization means in accordance with the frequency of said received signal.

4,006,463
COMPUTER-PRINT DEVICE CODE CONVERTER

Jimmy C. Hanks, Corpus Christi, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 29, 1974, Ser. No. 464,888
Int. Cl.² B41J 1/60
U.S. Cl. 340—172.5 **7 Claims**



1. A data converter for accepting first electrical signals indicative of a particular combination of tilt and rotational positions of a typewriter ball having a plurality of alpha-numeric characters and symbols, for accepting second electrical signals indicative of the upper or lower case condition of an alphabetical character that might be located at such particular combination of tilt and rotational positions of the typewriter ball, and for converting said first and second electrical signals to a binary bit coded electrical signal indicative of the alpha-numeric character or symbol located at such particular combination of tilt and rotational positions of the typewriter ball, comprising:

a. means for providing a case control signal in response to said second electrical signals, said case control signal being of a first level in response to said second electrical signals indicating an upper case condition of an alphabetical character and of a second level in response to said second electrical signals indicating a lower case condition of an alphabetical character,

b. means responsive to said case control signal for decoding said first electrical signals to provide a binary bit coded signal indicative of the alpha-numeric character or symbol and the upper or lower case of the character represented by such particular combination of tilt and rotational positions of a typewriter ball,

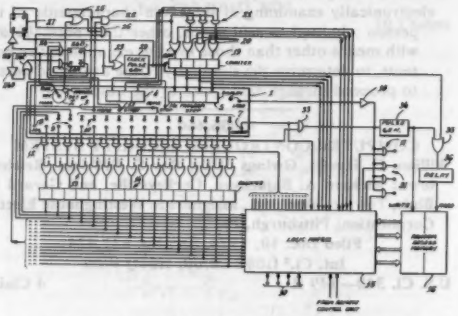
c. means responsive to said second electrical signals for generating a first control signal for enabling said decoding means, and

d. means for delaying said first control signal for a time interval sufficient to allow oscillatory transients associated with said first electrical signals to die away before the decoding of said first electrical signals.

4,006,464
INDUSTRIAL PROCESS CONTROLLER

William F. Landell, Saugerties, N.Y., assignor to FX Systems, Inc., Kingston, N.Y.

Filed Feb. 20, 1975, Ser. No. 551,256
Int. Cl.² G06F 3/02, 15/02
U.S. Cl. 340—172.5 **6 Claims**



1. An industrial process controller having run, manual, and set-up modes wherein process control digital information words may be stored and recalled, each word being associated with one of a plurality of numerically ordered program steps, the controller being capable of operating on one program step at any given time and comprising:

a panel,

manually operated MODE switch means on said panel for selecting one of said run, manual and set-up modes,

manually operated HOME switch means on said panel for numerically selecting any one of said ordered program steps,

signal operating sequencing means for setting said controller to sequentially operate on said plurality of program steps in response to a RUN signal,

PROGRAM STEP display means on said panel for numerically displaying a current program step on which said controller is operating,

manually operated HOME COMMAND switch means on said panel for setting the industrial process controller to said manually selected program step,

a COMMAND storage register means comprising a plurality of storage elements,

a plurality of manually operated PROGRAMMING switches on said panel, each of said PROGRAMMING switches corresponding to a bit of one of said digital words and being connected to a separate storage element of said COMMAND storage register means in response to said set-up mode of said controller,

a randomly accessible memory means for storing digital words in locations corresponding to said program steps,

manually operated CONNECT switch means on said panel and operable in said set-up mode for storing in said memory means a digital word from said storage register means selected with said PROGRAMMING switches in a storage location of said random access memory corresponding to said program step,

a plurality of output terminals connected to said controller for providing signals for a process being controlled,

means connected to said storage register means and to said output terminal means responsive to a first plurality of said digital words in said register for providing defined output signals on said output terminal means,

manually operated START swtich means on said panel and functional in said RUN MODE for providing said RUN signal, thereby automatically sequentially setting said controller to each of said program steps,

means responsive to said RUN and MANUAL modes of said controller and to the setting of the controller to a particular program step for reading the digital word corresponding to said particular program step into said storage register means whereby said output terminals are sequentially provided with signals corresponding to the digital words manually selected with said programming switches,

means responsive to a second plurality of said words for setting said controller to a program step directed by said second plurality of words, and

manually operated JOG switch means on said panel and functional in said MANUAL and SET-UP modes of said controller for selectively setting the controller to the next sequential program step.

4,006,465

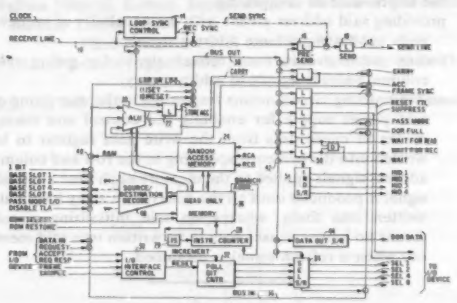
APPARATUS FOR CONTROL AND DATA TRANSFER BETWEEN A SERIAL DATA TRANSMISSION MEDIUM AND A PLURALITY OF DEVICES

Jon L. Cross, San Jose; Merle Edward Homan, Los Gatos; Guenther Keith Machol, Saratoga; Richard La Verne Malm, Los Gatos, and Larry Eugene Svelund, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 14, 1975, Ser. No. 577,495

Int. Cl.² G06F 9/16

U.S. Cl. 340—172.5 **29 Claims**



1. Apparatus for use in establishing and maintaining communication with a controlling module (which transmits data and control commands serially by bit over a serial transmission medium) and one or more I/O modules comprising:

an arithmetic unit;

a buffer;

first means connecting said buffer to said arithmetic unit for enabling the storing in said buffer of the result of an arithmetic operation performed by said arithmetic unit;

second means connecting said buffer to said serial transmission medium for providing a second input to said buffer for enabling the storing, in said buffer, of a bit of data received over said transmission medium;

a plurality of source data paths connected to respective sources of data, including data from said I/O modules;

an input bus operatively connected to said arithmetic unit;

source switching means connected to said source data paths and said input bus, energizable for connecting selected ones of said source data paths to said input bus; and

stored program control means, connected to said arithmetic unit and to said switching means, including means for storing sequential program instructions, said instructions including arithmetic instructions executable by said arithmetic unit, to perform arithmetic operations and control instructions for selectively energizing said switching means to thereby connect selected source data paths to said input bus in accordance with control information contained in said instructions.

4,006,466

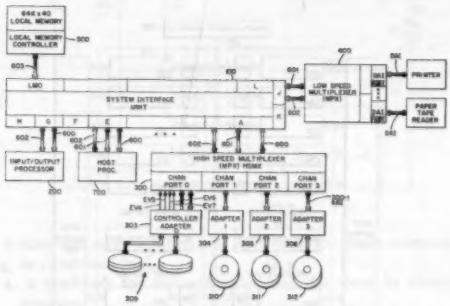
PROGRAMMABLE INTERFACE APPARATUS AND METHOD

Garvin Wesley Patterson, Glendale; William A. Shelly, Phoenix; Jaime Calle, Glendale, and Earnest M. Monahan, Phoenix, all of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Mar. 26, 1975, Ser. No. 562,364

Int. Cl.² G06F 1/00

U.S. Cl. 340—172.5 **24 Claims**



1. An input/output system for controlling input/output data transfer operations of a plurality of peripheral devices, said system comprising:

a memory means;

processor means, said processor means including means for generating commands during said data transfer operations involving said plurality of peripheral devices;

multiplexer means;

means interconnecting said memory means, said processor means and said multiplexer means for communiction on a priority basis;

said multiplexer means including at least one adapter port coupled to said plurality of peripheral devices, said multiplexer means comprising:

a plurality of registers arranged for storing interrupt control information transferred by said commands pertinent to the processing of said input/output operations by said multiplexer means;

a first one of said registers containing coded signals specifying a numerical value used for identifying one of a plurality of interrupt routines executed by said processor means to process interrupt event signals received from said devices and a second one of said registers containing coded signals specifying numerical values for identifying a plurality of levels of priority to be given by said multiplexer means to said plurality of interrupt event signals received from said device;

interrupt logic means coupled to receive said event signals from said adapter port;

priority network means coupled to said logic means and to said second register, said priority means being operative to generate signals indicating the request having highest priority in accordance with interrupt event signals received from said logic means, said highest priority being defined in accordance with said values stored in said second register; and,

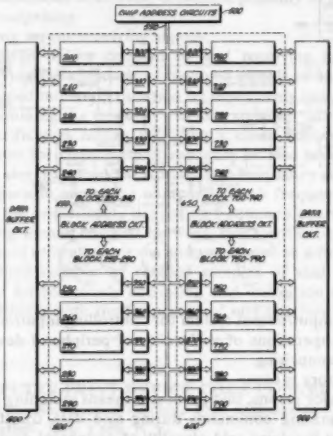
output register means being operatively coupled to said priority network means and to said plurality of registers, said priority network means generating signals causing signals representative of the contents of said first register and one of said values stored in said second register corresponding to the event signal having the highest priority to be applied to said output register means for transfer to said interconnecting means as a part of an interrupt request.

4,006,467

ERROR-CORRECTIBLE BIT-ORGANIZED RAM SYSTEM

David A. Bowman, Glendale, Ariz., assignor to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Nov. 14, 1975, Ser. No. 632,127
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R **9 Claims**



1. A memory organization for random access memory (RAM) chips comprising:

chip address means for providing first signals;

block address means for providing second signals; and

memory means, connected to said chip address means and said block address means, said memory means including:

a plurality of blocks of said RAM chips, each of said blocks responsive to said second signals for selecting one of said RAM chips; and

a plurality of driver circuits corresponding to said plurality of RAM chip blocks each of said driver circuits responsive to said first signals for providing a set of third signals to the chips within said corresponding block, said third signal selecting a location within said RAM chips for accessing;

data bussing means;

data buffer means coupled by said data bussing means to said blocks for transmitting data to and from said blocks; and

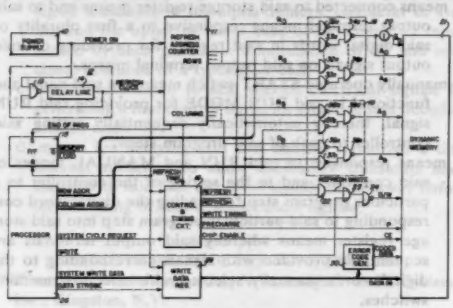
enabling means coupled to said chip addressing means to said block addressing means, and to said buffering means for enabling their operation.

4,006,468

DYNAMIC MEMORY INITIALIZING APPARATUS

Marvin K. Webster, Glendale, Ariz., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Continuation of Ser. No. 386,128, Aug. 6, 1973, abandoned. This application Sept. 2, 1975, Ser. No. 609,754
Int. Cl.² G11C 7/00
U.S. Cl. 340—173 DR **4 Claims**



1. In a dynamic memory having a plurality of memory cells arranged in an array of m columns and n rows where m and n are integers; a power supply for said memory; a write data register; control and timing means, said memory adapted upon the application to it of appropriate signals from the control and timing means to write data stored in the write data register into a given cell, to read data from a given cell, and to restore the data stored in a given cell; clock means for producing clock signals; address means responsive to said clock signals for sequentially producing row address signals and a refresh time signal; the control and timing means responsive to said refresh time signal producing a refresh signal; said memory, in response to row address signals being gated to it in response to a refresh signal and other appropriate signals being applied to the memory, restoring the data stored in the cells of the row corresponding to said row address signals; said address signals, refresh signal and other appropriate signals being applied to the memory at a frequency such that the data stored in all the cells of the array are refreshed while the data stored in the memory cells has a high probability of being valid;

the improvements comprising:

providing said address means with the capability of sequentially producing column address signals;

means responsive to each refresh signal for gating said column address signals to said memory;

and initializing circuit means responsive to the energizing of said power supply for enabling the control and timing means to cause data from the write data register to be written into the cell corresponding to the row and column address signals applied to the memory each time a refresh signal is produced until all the cells of the array have data written into them, whereupon said initializing circuit means no longer causes data to be written into said memory when a refresh signal is produced.

4,006,469

DATA STORAGE CELL WITH TRANSISTORS OPERATING AT DIFFERENT THRESHOLD VOLTAGES

Gerald W. Leehan, Centreville, Va.; Sylvester F. Miniter, III, Wheaton, Md., and Augustus J. Sassa, Manassas, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1975, Ser. No. 641,328
Int. Cl.² G11C 11/40
U.S. Cl. 340—173 R **15 Claims**

14. A semiconductor device comprising

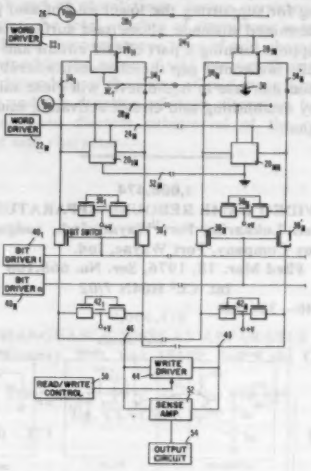
a. a semiconductor substrate,

b. first, second and third sets of transistors formed in the substrate in first and second groups,

c. diffusion rails formed in the substrate between the first and second groups and serving as bit lines connected to the third transistor in each group,

d. first metalization disposed on the substrate and connected to the first set of transistors for supplying power to the groups of transistors,

e. second metalization disposed on the substrate and connected to the second set of transistors as a power return for the groups of transistors,



f. third metalization disposed on the substrate for interconnecting the second set of devices as a storage circuit, and

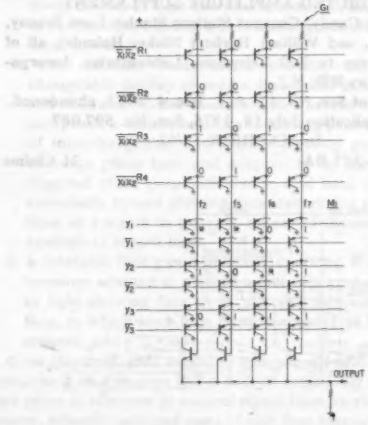
g. fourth metalization disposed on the substrate and connected to the first and third sets of devices for controlling the power to the storage circuits and the connection of the third set of devices to the bit lines.

4,006,470

READ-ONLY MEMORY

Hajime Mitarai, Komae, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed June 30, 1975, Ser. No. 591,717
Claims priority, application Japan, July 3, 1974, 49-76074
Int. Cl.² G11C *11/36*
U.S. Cl. 340—173 SP **3 Claims**



1. A read-only memory comprising:

a set of memory cells defining a matrix and having pluralities of row and column conductors;

multiplexer means including at least one merged column and having a plurality of outputs and first and second pluralities of inputs, said first inputs being coupled respectively to said column conductors of said set of memory cells; and

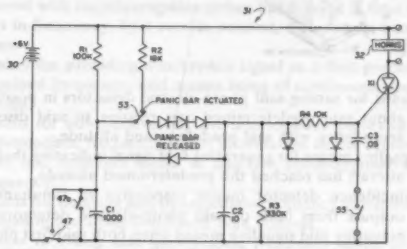
row selector means having first and second groups of outputs for providing selection signals to select desired locations of said memory matrix, said first group of outputs being coupled respectively to said row conductors of said set of memory cells, and said second group of outputs being coupled respectively to said second plurality of inputs of said multiplexer means, wherein a row selection of said memory matrix is provided at said plurality of outputs of said multiplexer means.

4,006,471

EMERGENCY EXIT LOCK SYSTEM FOR DOORS

Michael Pappas, Irvington, N.J., assignor to Detex Corporation, New York, N.Y.

Filed Jan. 31, 1975, Ser. No. 545,922
Int. Cl.² G08B *13/08*
U.S. Cl. 340—274 R **11 Claims**



1. Exit and entry control lock apparatus for doors comprising, in combination:

a. a latchbolt for releasably holding the door in closed position;

b. dead latch means for securing the latchbolt against release;

c. first and second independently operable dead latch release actuators, said second release actuator comprising:

i. a control member movable between active and inactive positions, and

ii. a mode control member movable between two positions to secure the control member selectively in either of its positions;

d. a panic bar connected to the first release actuator;

e. a key-actuated means connected to the second release actuator;

f. an alarm and energizing means therefor;

g. an alarm-energizing control switch connected to be actuated upon actuation of the panic bar; and

h. alarm-disabling switch means coupled to said key-actuated means to disable the alarm-energizing means.

4,006,472

AIRCRAFT ALTITUDE ALERTING DEVICE

Leonard M. Greene, Chappaqua, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.

Filed May 7, 1975, Ser. No. 575,161
Int. Cl.² G08B *5/36*
U.S. Cl. 340—181 **4 Claims**

3. An altitude alerting device mounted in an aircraft for providing a signal indicating when the aircraft has reached a predetermined altitude comprising:

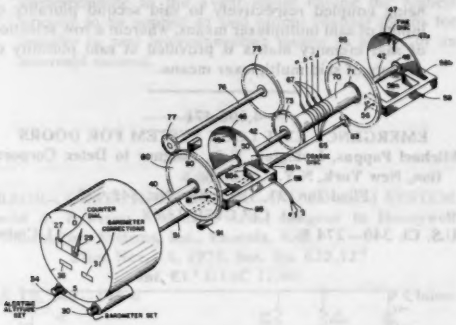
an altimeter having an indicator mechanism providing a mechanical signal in accordance with aircraft altitude,

altitude marker means comprising first and second discs, each of said discs having a radial slot formed therein,

means for supporting said discs for rotation about a predetermined axis,

said discs being rotatably driven by said mechanical signal to position said slots about said predetermined axis in accordance with aircraft altitude,

sensor means comprising first and second photo-electric detectors positioned proximate to said first and second discs respectively, said first and second detectors and discs representing "coarse" and "fine" altitude positions respectively,



means for setting said photo-electric detectors in positions about said predetermined axis relative to said discs in accordance with said predetermined altitude,

signaling means for generating said signal indicating that the aircraft has reached the predetermined altitude,

coincidence detector means responsive to simultaneous outputs from both of said photo-electric detectors for actuating said signaling means when both said first photo-electric detector and said first disc are in corresponding positions about said axis and said second photo-electric detector and said second disc are in corresponding positions about said axis.

4,006,473

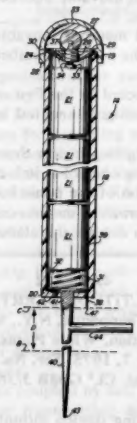
IRRIGATION SIGNAL

Gerald T. Civalier, P.O. Box 6822, Phoenix, Ariz. 85009

Filed Sept. 2, 1975, Ser. No. 609,308

Int. Cl.² G08B *21/00*

U.S. Cl. 340—244 C **4 Claims**



1. An electric signalling device for emitting a perceptible signal when a liquid has risen to a predetermined height above a selected surface, said signalling device comprising:

a. a housing having a source of electrical energy therein;

b. electrically activated means for emitting a perceptible signal carried by said housing and having an activation circuit connected to said source of electrical energy;

c. an electrically conductive probe communicating with said signal emitting means and having the lower end thereof depending from said housing; and

d. an electrically conductive support depending from said housing for supporting the lower end of said probe at a predetermined distance above said surface, said probe and support forming a part of said circuit and defining a generally horizontal gap therebetween whereby a predetermined increase in liquid level will close said gap and thereby establishing said circuit activating said perceptible signal.

4,006,474

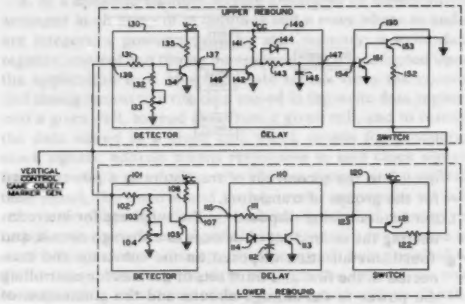
VIDEO GAME REBOUND APPARATUS

Jeffrey Reed Lukkarila, Fort Wayne, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.

Filed Mar. 18, 1976, Ser. No. 668,108

Int. Cl.² H04N *7/02*

U.S. Cl. 340—324 AD **11 Claims**



1. Apparatus for providing a rebound function in a video game comprising means for detecting the presence of a game object marker near a boundary; and means for forcing said game object marker to move away from said boundary with a diminishing velocity when said game object marker is coincident with said boundary marker.

4,006,475

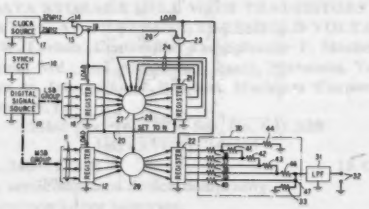
DIGITAL-TO-ANALOG CONVERTER WITH DIGITALLY DISTRIBUTED AMPLITUDE SUPPLEMENT

James Charles Candy, Convent Station; Stanley Leon Freeny, Middletown, and William Herbert Ninke, Holmdel, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation of Ser. No. 421,678, Dec. 4, 1973, abandoned. This application July 18, 1975, Ser. No. 597,087

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 DA **21 Claims**



1. In combination,

means for producing an analog signal corresponding in magnitude to each of the values that can be represented by a most significant bit group of a multibit pulse coded character, and

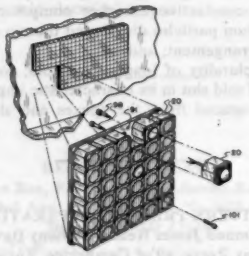
means, responsive to a less significant bit group of the same character, for temporarily altering said most significant bit group value at an input to said producing means, and thereby altering said magnitude, by a predetermined amount and at plural times during persistence of said character, the total number of alterations in said magnitude, during the persistence time of said character, being determined by the value of said less significant bit group and independent of the value of said most significant bit group, and the duration of each alteration being for a predetermined discrete subinterval of the persistence time of said character.

4,006,476

CHANGEABLE DISPLAY APPARATUS

Russell H. Romney, P.O. Box 15657, Salt Lake City, Utah 84115

Filed May 9, 1975, Ser. No. 576,127
Int. Cl.² G08B 5/00
U.S. Cl. 340—373 **10 Claims**



1. Apparatus for displaying intelligence in groups of intelligible symbols such as alphabetic and/or numerical symbols and the like, which comprises, in combination:

a. A multiplicity of similar modules mounted adjacent each other in rows and columns and each adapted to selectively display at least one of said symbols, said multiplicity of modules presenting a substantially continuous viewing area, in which

b. each module comprises a plurality of individuallly changeable display elements assembled in multiple rows and columns in the module and wherein each element comprises a hollow housing consisting primarily of a pair of interchangeable and similar housing parts having a common plane base and adapted to be assembled on a diagonal plane perpendicular to said base to present an essentially square viewing face except for slight truncations at corners to provide access to mounting bolts or equivalent in said base,

c. a rotatable face piece pivotally mounted in each of said housings adapted to present selectively a relatively visible or light-showing face or a relatively non-visible or dark face, in which each face piece incorporates a permanent magnet, and

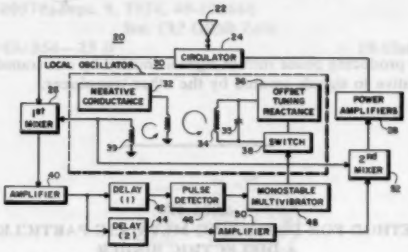
d. an electromagnet mounted within each said housing and comprising an iron core and a coil for selectively rotating said face piece in response to control signal from an electric power source, whereby selected ones of said face pieces in a module are turned to display an intelligible symbol in said module.

4,006,477

PULSE COHERENT TRANSPONDER WITH PRECISION FREQUENCY OFFSET

Russell R. Yost, Jr., Phoenix, and Eric J. Carlson, Mesa, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Jan. 6, 1975, Ser. No. 538,700
Int. Cl.² G01S 9/58
U.S. Cl. 343—6.8 R **13 Claims**



1. Radar transponder apparatus for receiving a sequence of interrogation pulses and generating reply pulses that are phase coherent with the interrogation pulses but delayed in time and offset in frequency, by a precise amount, including in combination:

means for providing a reference signal at a first predetermined frequency, said means being of continuous operation;

means for down-converting the interrogation pulses to intermediate frequency signal information in the presence of said reference signal at said first predetermined frequency;

means for delaying said intermediate frequency signal information for a predetermined time interval;

means receiving said intermediate frequency signal information from said down-converting means, which is coupled to said means for providing a reference signal, for causing the frequency of said reference signal produced thereby to be incremented by a fixed, predetermined amount, the instantaneous phase of said incremented frequency reference signal being related to the instantaneous phase of said reference signal at said first predetermined frequency with said relationship being substantially invariant from pulse-to-pulse of the sequence of received interrogation pulses; and

means for up-converting said delayed intermediate frequency signal information in the presence of said reference signal at said incremented frequency, said up-converted signal information being a sequence of reply pulses offset in frequency but phase coherent with said received interrogation pulses.

4,006,478

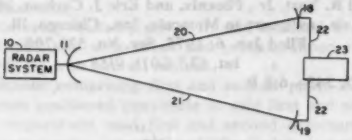
SECURITY DEVICE

Bernard L. Lewis, 1673 Magnolia Ave., Winter Park, Fla. 32789, and Dean D. Howard, 4230 Oak Lane, Oxon Hill, Md. 20021

Filed Aug. 15, 1958, Ser. No. 755,361
Int. Cl.² G01S 7/38
U.S. Cl. 343—18 E **7 Claims**

1. In a signal jamming device, first and second transducers physically displaced relative to each other said transducers having substantially identical signal coupling characteristics on the basis of direction to a selected distant object, means for coupling said transducers whereby signals received by one

transducer are emitted by the other and vice versa, and differential impedance means connected to said means for coupling



for producing phase shift of signals emitted by one transducer relative to signals emitted by the other transducer.

4,006,479

METHOD FOR DISPERSING METALLIC PARTICLES IN A DIELECTRIC BINDER

Donald J. LaCombe, De Witt, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 4, 1969, Ser. No. 798,263
Int. Cl.² H01Q *17/00*
U.S. Cl. 343—18 A **6 Claims**

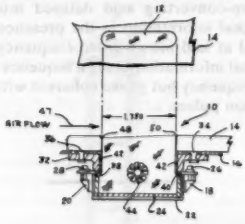
4. A radar energy absorbing material comprising a solid, homogeneous blend of sub-micron sized, finely divided metal particles, a finely divided dielectric material and a resinous binder.

4,006,480

ANTENNA WINDOW ASSEMBLY FOR ABLATIVE HEAT SHIELDS

Raymond O. Charette, Fountain Valley, and Hank A. Konczak, Costa Mesa, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 3, 1976, Ser. No. 655,029
Int. Cl.² H01Q *1/42*
U.S. Cl. 343—705 **1 Claim**



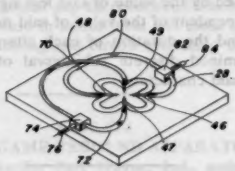
1. An antenna window assembly for ablative heat shields having a support member and an aperture comprising: an ablative heat resistant window capable of passing radio frequency electromagnetic radiation, said window having a shape compatable with a heat shield aperture; a plurality bracket means adapted to be affixed to the heat shield support member; retainer means attached to the said bracket means adjacent said window; and a support means abutting the window at one end connected between at least two retainer means whereby the leading edge of said window does not extend into the air flow over the heat shield and the trailing edge of the window extends beyond the heat shield into the said air flow.

4,006,481

UNDERGROUND, TIME DOMAIN, ELECTROMAGNETIC REFLECTOMETRY FOR DIGGING APPARATUS

Jonathan D. Young, Worthington; Curtis W. Davis, III, Columbus; Leon Peters, Jr., Columbus, and Ross Caldecott, Columbus, all of Ohio, assignors to The Ohio State University, Columbus, Ohio

Filed Dec. 10, 1975, Ser. No. 639,249
Int. Cl.² H01Q *13/10*
U.S. Cl. 343—770 **27 Claims**



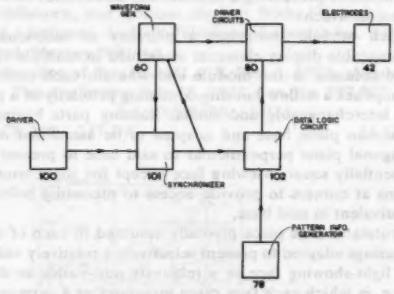
1. A broad bandwidth slot antenna comprising:
a conductive ground plane element configured having an inwardly disposed opening of select profile;
conductive element means situate within said ground plane element opening and configured having a periphery cooperating with said ground plane element to define a slot arrangement exhibiting a surface pattern having symmetry about two orthogonal axes at the surface of the conductive ground plane element, said pattern having the form of four orthogonally arranged loops;
a lossy, non-conductive absorber comprising a ceramic having carbon particles distributed therein situate within said slot arrangement; and
including a plurality of loading resistors, for terminating portions of said slot in its characteristic impedance, symmetrically spaced from the apexes and shunted across said slot.

4,006,482

PATTERN PRINTING APPARATUS

Christopher Edmund James Heath; Anthony David Paton, and David Anthony Reeve, all of Cambridge, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 1, 1975, Ser. No. 573,605
Claims priority, application United Kingdom, May 6, 1974, 19809/74
Int. Cl.² G01D *15/18*
U.S. Cl. 346—75 **1 Claim**



1. A circuit for controlling printing apparatus of the type adapted to print by depositing small drops of printing liquid in accordance with a pattern information signal on a surface to be printed during relative movement caused by surface drive means between the apparatus and said surface, comprising a

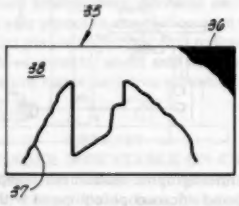
row of printing guns extending transversely to said direction of relative movement, each gun having an orifice, printing liquid supply means for supplying printing liquid under pressure to the orifice to form a jet of printing liquid directed towards the location in the apparatus of the said surface, means for imparting regularly spaced variations in the cross section of the jet to stimulate drop formation, charge electrode means located adjacent the position in the jet path of drop separation to effect charging of drops formed in the jet path, drop deflection means for providing a substantially constant electrostatic field through which pass the drops formed in the jet path thereby to deflect electrically charged drops to an extent dependent upon the charge levels on the drops, and drop intercepting means for intercepting uncharged drops, said circuit comprising waveform generating means for making available to the charge electrode means of each printing gun a voltage waveform of constant period, the magnitude of said voltage at corresponding times during each period thereof being the same and the period being sufficient to span the formation of a plurality of drops in each jet path, electrical means for controlling in accordance with the pattern information signal the application of said waveform, at moments appropriate to the charging of the drops during each period of said waveform, to charge electrode means of any of the printing guns thereby to determine whether drops formed in the jet paths of those printing guns are charged or not, and a synchronizer for producing, in response to a first input signal from the surface drive means indicating the movement of said surface through a predetermined distance and a second input signal from said waveform generating means at the end of each of said waveforms, an output signal initiating the formation of the next of said waveforms and permitting the passage of the pattern information to said electrical means.

4,006,483

RECORDING CHART

Harold Eugene Box, P.O. Box 782, Liberal, Kans. 76901

Filed Aug. 18, 1975, Ser. No. 605,610
Int. Cl.² G01D *15/34*
U.S. Cl. 346—77 R **2 Claims**



1. A chart for use with a device having a marking stylus for inscribing scores representing recordings on said chart which comprises:

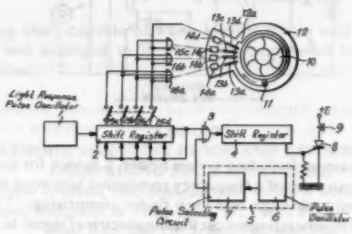
a flat dark-colored flexible sheet of a size and shape adapted to be installed in said device, one side of said sheet having a uniform layer of light-colored high temperature paint composition applied thereto so that said marking stylus inscribes dark-colored scores in a light-colored background on said chart, said light-colored high temperature resistant paint composition being comprised of titanium dioxide present in said composition in an amount of about 9.2% by weight, magnesium silicate present in an amount of about 9.2% by weight, silicone resin present in an amount of about 9.2% by weight and hydrocarbon liquid solvent present in said composition in an amount of about 72.4% by weight.

4,006,484

CAMERA SYSTEMS FOR PROVIDING PRECISE EXPOSURES WITH DIGITAL LIGHT MEASUREMENT

Tsukumo Nobusawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 576,021, May 9, 1975. This application May 27, 1975, Ser. No. 580,698
Claims priority, application Japan, May 31, 1974, 49-62131; June 17, 1974, 49-68869; Sept. 3, 1974, 49-100578; Sept. 9, 1974, 49-103660
Int. Cl.² G03B *7/08*
U.S. Cl. 354—23 D **18 Claims**

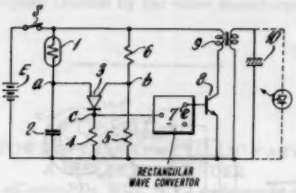


1. In a camera, diaphragm means for determining the magnitude of the exposure aperture through which film in the camera is exposed, shutter means for determining the time during which film in the camera is exposed, said diaphragm means and shuter means forming a pair of means for participating in the determination of the extent to which film in the camera is exposed, said pair of means including one means which is adjustable and preliminarily set to remain normally at a given adjusted position during exposure of the film, and the other of said means being automatically operable in accordance with light intensity, light-responsive means for responding to the light intensity and for providing in accordance therewith a quantity the magnitude of which corresponds to the light intensity, digital memory means having a series of digital positions at least one of which is close to but does not necessarily coincide precisely with the magnitude of said quantity, said digital memory means being operatively connected to said light-responsive means for memorizing said magnitude of said quantity at least approximately by way of said one digital position which is close thereto, detecting means operatively connected with said digital memory means for detecting at least approximately the difference between the magnitude of a quantity corresonding precisely to said one digital position of said digital memory means and the actual magnitude of a quantity corresponding more precisely to the light intensity to which said light-responsive means responds, adjusting means operatively connected to said one adjustable means for adjusting the latter in accord with said difference, if any, detected by said detecting means, so as to provide at said one means a compensating adjustment according to said difference, and said digital memory means being operatively connected with the other of said means for operating the latter according to said one digital position which is close to the magnitude of a quantity corresponding to said light intensity, whereby if the latter magnitude does not coincide precisely with said one digital position the compensating adjustment of said one means will provide for film in the camera an exposure more accurate than that which would be achieved without said compensating adjustment.

4,006,485
LUMINANCE CONTROLLED INDICATOR IN CAMERA VIEW FINDER

Akio Yamanishi, Tondabayashi, and Mashio Kitaura, Osaka, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 406,745, Oct. 15, 1973, abandoned. This application May 27, 1975, Ser. No. 581,305
Claims priority, application Japan, Oct. 19, 1972, 47-104924
Int. Cl.² G03B *17/20*; G01J *1/32*
U.S. Cl. 354—53 **16 Claims**



1. In a camera including a view finder, a device for controlling the luminance of a frequency responsive luminous indicator observable through said view finder comprising:

means for generating an oscillating electrical signal to intermittently energize said luminous indicator at a frequency in which said luminous indicator is observed as being continuously energized; and

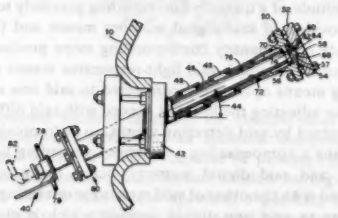
means including a photosensitive element exposed to scene light for transmitting the ouput of said photosensitive element to control the camera exposure;

said generating means including means for varying the frequency of the oscillating signal of said generating means in response to said output of the photosensitive element to increase and decrease said frequency as the scene brightness in the view finder increases and decreases respectively whereby the luminance of the indicator which is observed as continuous is variable in conformity with the scene brightness.

4,006,486
OPTICAL VIEWING, PHOTOGRAPHIC DEVICE FOR VAPOR GENERATOR

Jesse Glispin Vaughn, Wadsworth, Ohio, and Steven Douglas Vander Kamp, Midland, Mich., assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Sept. 19, 1975, Ser. No. 615,143
Int. Cl.² G03B *29/00*; F22D *1/00*
U.S. Cl. 354—76 **5 Claims**

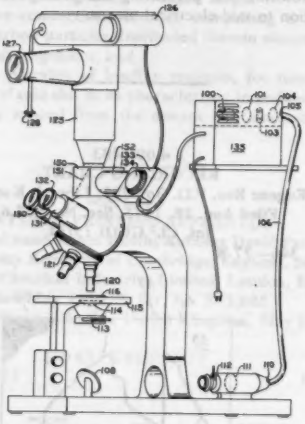


1. In combination with a drum having an upper steam space and a lower water space, steam and water separating means disposed within the drum, incandescent lamp means disposed within the drum to illuminate the interior thereof, and a device for viewing the illuminated interior, said device having concentrically spaced inner and outer tubes extending into the drum, an annular plate mounted on the outer tube end within the drum, said plate defining a viewing port fitted with a glass window and including a transparent mica shield fronting the drum interior, said inner tube end within the drum being capped by a fish eye lens facing the glass window, and an eye piece being attached to the inner tube end outside the drum, a sleeve interposed between the inner and outer tubes to define an annular passageway surrounding said inner tube, and means for circulating a cooling fluid through said passageway.

4,006,487
PHOTOMICROGRAPHIC ILLUMINATOR

Raymond P. Allen, 2242 Sourek Road, Akron, Ohio 44313

Division of Ser. No. 524,036, Nov. 15, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,019
Int. Cl.² G03B *17/48*
U.S. Cl. 354—79 **10 Claims**



1. A photomicrographic instrument comprising:

a. a compound microscope equipped with a camera,

b. a stage for said microscope for positioning an object to be photographed,

c. A Kohler microscope illuminating system for illuminating said object, including at least a collecting lens, a field stop diaphragm, a condenser diaphragm, and a condenser lens,

d. a fiber optic with one end at the entrance pupil of the illuminating system, facing the illuminating system,

e. illumination means comprising at least one light source, which illumination means are capable collectively of providing light of low intensity and of high intensity at different sequential times,

f. said illumination means being arranged to direct the light to the fiber optic end remote from the entrance pupil of the illuminating system, and

g. control means for limiting the total radiant energy of the high intensity light in the camera in response to an integrating light sensor in the microscope optical system.

4,006,488

BELLOWS FOR USE IN A FOLDABLE CAMERA

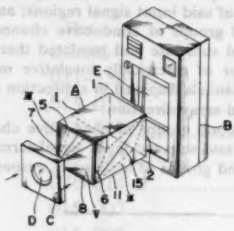
Makoto Kuboshima, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Sept. 4, 1975, Ser. No. 610,349

Claims priority, application Japan, Sept. 5, 1974, 49-102625

Int. Cl.² G03B 17/04

U.S. Cl. 354—187 10 Claims



1. In a foldable camera with a bellows which is made of light proof material taking a shape of a hollow tube of rectangular cross section and of a hexahedral prism in the expanded configuration with top, right-side, left-side and bottom planes and openings at the both ends thereof and being symmetrical with respect to the light axis of the bellows, and being affixed between the exposure frame of a camera body and the lens mount of a lens at said openings, respectively, the improvement wherein the bellows comprises in combination; first outward folding lines provided along all edges of bellows in each of said planes to permit folding of each of said planes toward the exposure frame or lens mount, a second inward folding line provided on the top plane to fold the top plane in two to raise the lens mount against the exposure frame, a third inward folding line provided on the bottom plane parallel with and adjacent to the edge affixed to the exposure frame to fold the bottom plane in two to bow the lens mount against the exposure frame, at least one pair of fourth outward folding lines, each extending diagonally from the upper corner of each of the side planes at the side of the exposure frame to the bottom edge of the same plane and being symmetrical with each other to form at least one triangle, and a set of fifth inward and outward folding lines provided on both the side planes to fold the side planes in association with the folding of said top and bottom planes about said first to fourth lines so as to pile up the bellows material about said first and fourth lines between the exposure frame and lens mount.

4,006,489

FILM REWINDER MOUNTABLE ON CAMERA

Hiroshi Aizawa, Machida; Tomonori Iwashita, Chofu; Tadahide Fukushima, Tokyo; Yukio Iura, Yokosuka; Masanori Uchidoi, Kawasaki, and Susumu Kozuki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

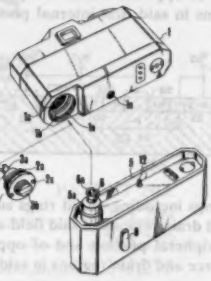
Filed May 22, 1975, Ser. No. 579,877

Claims priority, application Japan, May 29, 1974, 49-61558[U]

Int. Cl.² G03B 1/00

U.S. Cl. 354—214 5 Claims

1. Camera apparatus comprising a housing having an exterior surface and an interior surface, said housing forming a compartment for a film magazine, said housing having a film winding hole therein extending from the exterior surface to the interior surface and opening into said compartment, means selectively connectable to said housing and insertable through said film rewinding hole into said compartment for rewinding the film in a film magazine, said means comprising a manual rewinding device and an electrically operated rewinding device, each of said manual rewinding device and electrically operated rewinding device comprising a rewinding shaft for selectively extending through said film rewinding hole and a rewind coupling part on the end of each said rewinding shaft capable of being located within said compartment and arranged to be releasably connected to the film magazine.



4,006,490

CATHODE FOR GUNN DIODE AND GUNN DIODE COMPRISING SUCH A CATHODE

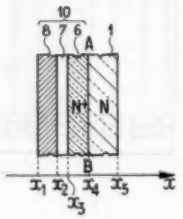
Paul-Cyril Moutou, and Jean-Jacques Godart, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Nov. 28, 1975, Ser. No. 636,292

Claims priority, application France, Nov. 29, 1974, 74.39190

Int. Cl.² H01L 47/02

U.S. Cl. 357—3 4 Claims



1. A cathode for a Gunn diode comprising an active zone formed by Gallium Arsenide of a given type of conductivity, and comprising in combination two layers cooperating with one another, and situated between said active zone and a metallic deposit serving as cathode contact: the first of these layers deposited on said active zone being formed of Gallium Arsenide, having the same type of conductivity as that forming the active zone conductivity and having a strong doping concentration, and said second being formed of amorphous germanium.

4,006,491

INTEGRATED CIRCUIT HAVING INTERNAL MAIN SUPPLY VOLTAGE REGULATOR

Allan A. Alaspa, and Robert R. Beutler, Tempe, Ariz., assignors to Motorola, Inc., Chicago, Ill.

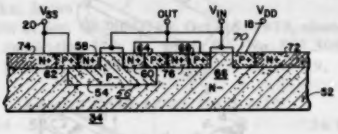
Filed May 15, 1975, Ser. No. 577,968

Int. Cl.² H01L 29/78, 27/02, 29/34; H03K 3/26

U.S. Cl. 357—23 2 Claims

1. A complementary field-effect transistor integrated circuit semiconductor chip comprising a first internal portion of complementary field-effect transistor circuitry having collapsed guard rings therein and a second peripheral portion of complementary field-effect transistor circuitry having non-collapsed guard rings therein, said collapsed guard rings in-

cluding guard rings substantially contiguous with source and drain regions of said field-effect transistors of said first internal portion and of opposite conductivity type to said source and drain regions in said first internal portion, said non-collapsed guard rings including guard rings substantially spaced from source and drain regions of said field-effect transistors of said second peripheral portion and of opposite conductivity type to said source and drain regions in said second peripheral portion.

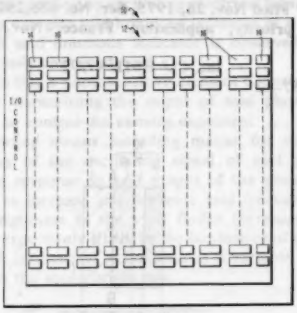


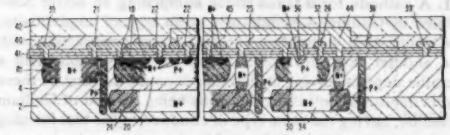
4,006,492

HIGH DENSITY SEMICONDUCTOR CHIP ORGANIZATION

Edward Baxter Eichelberger, Purdy Station, and Gordon Jay Robbins, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 23, 1975, Ser. No. 589,231
Int. Cl.² H01L *27/10, 29/06, 23/48*
U.S. Cl. 357—45 **25 Claims**





1. In a semiconductor, integrated circuit chip structure including a plurality of regions of different conductivity types extending into said chip to provide transistors and other circuit elements which are arranged into a plurality of substantially rectangular logic circuit units,

the improvement comprising:

first and second groups of said logic circuit units disposed in said semiconductor substrate in at least first and second columnar arrays, respectively;

each said unit being generally elongated in a direction transverse to the array direction and narrow in the array direction, the units in said first group being substantially longer than the units in said second group;

said units containing selectable input signal regions, reference potential terminals, output signal terminals at corresponding fixed positions and input signal terminals at selected ones of said input signal regions; and

first and second groups of conductive channels over the surface of said substrate and insulated therefrom by at least one layer of electrically insulative material, said conductive channels disposed in a direction substantially parallel to said array direction;

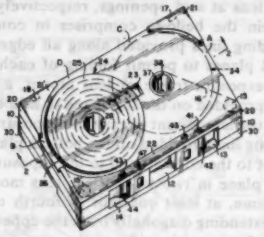
said first and second groups of conductive channels being connected to said selected input signal terminals of said first and second groups of logic units, respectively.

4,006,493

TAPE CASSETTE

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Filed May 19, 1975, Ser. No. 579,004
Int. Cl.² G11B *23/04, 15/30*
U.S. Cl. 360—132 **12 Claims**



1. A tape cassette, comprising in combination:

a cassette case comprising a first cover and a second cover substantially parallel to the first cover and a hollow body interposed between and adapted to said covers, the first cover having a first aperture and a first orifice therethrough substantially in line with each other, the second cover having a second aperture and a second orifice therethrough substantially in line with each other; and

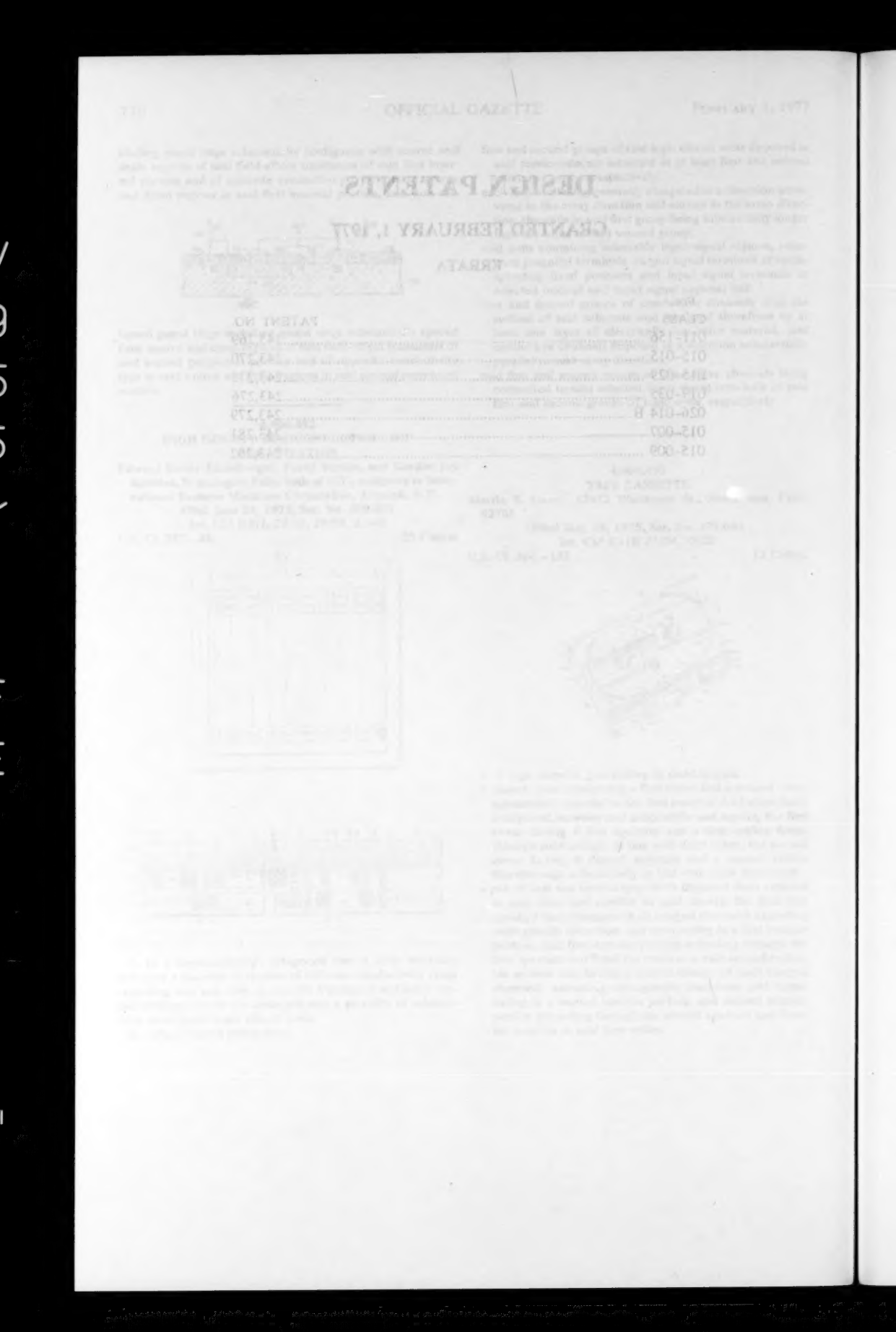
a pair of first and second oppositely disposed disks external to said case and parallel to said covers, the first disk having a first elongated shaft integral therewith extending orthogonally therefrom and terminating in a first annular portion, said first annular portion extending through the first aperture and fitted for rotation in said second orifice, the second disk having a second elongated shaft integral therewith extending orthogonally therefrom and terminating in a second annular portion, said second annular portion extending through the second aperture and fitted for rotation in said first orifice.

DESIGN PATENTS

GRANTED FEBRUARY 1, 1977

ERRATA

For CLASS	See PATENT NO.
011–156	243,269
015–015	243,270
015–029	243,275
019–035	243,276
026–014 B	243,279
015–007	243,281
015–009	243,282



DESIGNS

FEBRUARY 1, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

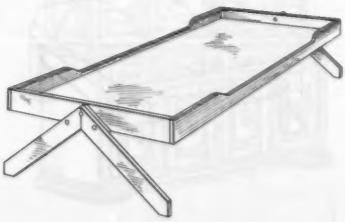
243,209
PLUME
Saul E. Fisher, 14 Elizabeth St., Buckhannon, W. Va. 26201
Filed Jan. 20, 1975, Ser. No. 542,263
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—263

243,210
BOOT
James F. Summa, Naugatuck, and John R. White, Woodbridge, both of Conn., assignors to Uniroyal Inc.
Filed Apr. 16, 1975, Ser. No. 568,484
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

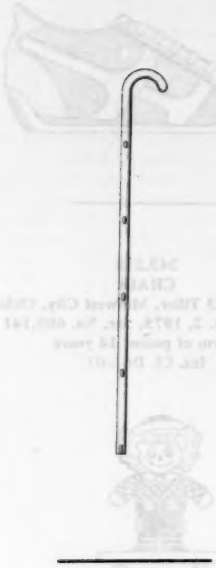
243,211
ATHLETIC SHOE
Robert J. Gamm, Olivette, Mo., assignor to Trans-World Shoe Import Co., Inc.
Filed Feb. 10, 1975, Ser. No. 548,877
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—309

243,212
CHAIR
James A. Downey, 133 Tiller, Midwest City, Okla. 73110
Filed Sept. 2, 1975, Ser. No. 609,141
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—12

243,213
CHILD'S COT
Joseph Kormos, 892 Herberton Place, Burlington, Ontario, Canada
Filed May 5, 1975, Ser. No. 574,422
Claims priority, application Canada, Feb. 3, 1975, 302751
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—14



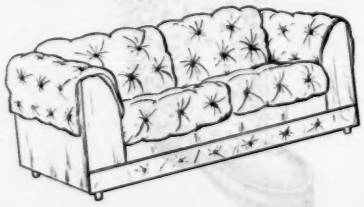
243,214
CLOTHES TREE
Nancy B. Werger, 4530 N. 23rd Ave. Apt. 23, Phoenix, Ariz. 85015
Filed Aug. 18, 1975, Ser. No. 605,651
Term of patent 14 years
Int. Cl. D6—*00*
U.S. Cl. D6—28



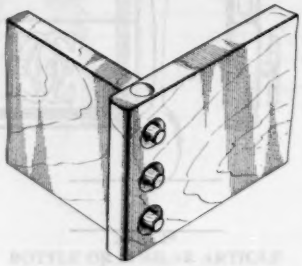
243,215
OTTOMAN
Thomas Winrow, Fort Myers, Fla., assignor to Futorian Corporation, Amsterdam, N.Y.
Division of Ser. No. 532,570, Dec. 13, 1974, Pat. No. Des. 237,923.
This application Sept. 16, 1975, Ser. No. 614,055
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36

243,216
ROCKING CHAIR
Robert P. Elsby, Floyds Knobs; John R. Strange, Orleans, and Walter S. Heazlitt, Jr., Floyds Knobs, all of Ind., assignors to Paoli Chair Company, Inc., Paoli, Ind.
Filed June 6, 1975, Ser. No. 584,416
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—49

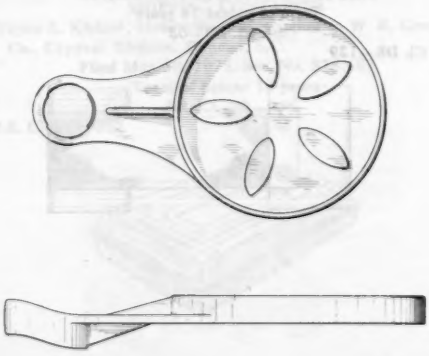
243,217
SOFA
Ernest E. Warsaw, 5665 Downey Road, Vernon, Calif. 90058
Filed Jan. 9, 1975, Ser. No. 539,574
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



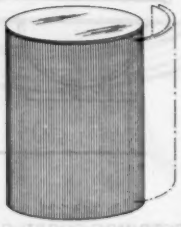
243,218
BED FRAME
Richard M. Baker, 1368 Berkley St., Anaheim, Calif. 92804
Filed Oct. 18, 1974, Ser. No. 516,013
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—84



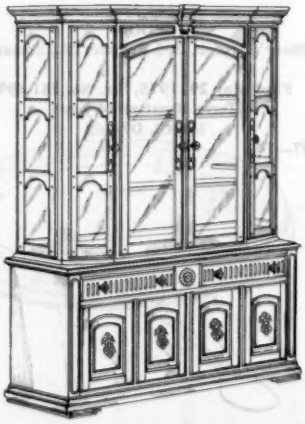
243,219
SHELF FOR POTTED PLANT STAND
Melvin L. Jeffries, 7306 E. 27th Place, Tulsa, Okla. 74129
Filed Jan. 15, 1976, Ser. No. 649,345
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—136



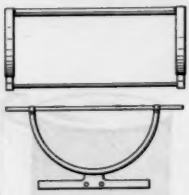
243,220
CARD HOLDER
Velma H. Binion, 1022 Whittier, St. Louis, Mo. 63113
Filed Aug. 27, 1975, Ser. No. 608,154
Term of patent 14 years
Int. Cl. D6—*148*
U.S. Cl. D6—148



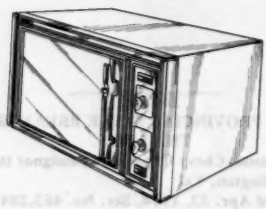
243,221
TWO-PIECE PROVINCIAL STYLE BREAKFRONT OR THE LIKE
Joseph E. Adkinson, Chevy Chase, Md., assignor to Wilfred G. Caldwell, Arlington, Va.
Filed Apr. 23, 1974, Ser. No. 463,284
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—154



243,222
TABLE
Jose A. Lopez, Miami, Fla., assignor to Camilo Muebles, Inc., Coral Gables, Fla.
Filed June 13, 1975, Ser. No. 586,716
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



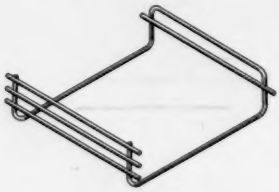
243,223
ELECTRONIC COOKING RANGE
Yoshio Suganoya, and Takao Miyake, both of Osaka, Japan, assignors to Sharp Corporation
Filed June 16, 1972, Ser. No. 255,324
The portion of the term of this patent subsequent to Sept. 4, 1987, has been disclaimed.
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—128



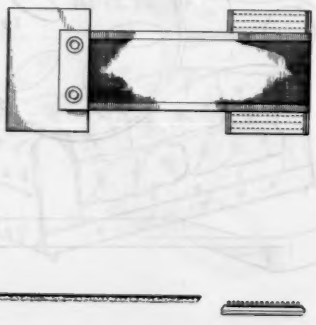
243,224
SPOON
Thomas Oliver Gorsuch, 305 Summer St., Somerville, Mass. 02144
Filed May 29, 1975, Ser. No. 581,899
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—143

243,225
SPOON
Thomas Oliver Gorsuch, 305 Summer St., Somerville, Mass. 02144
Filed June 20, 1975, Ser. No. 588,962
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—151

243,226
FIREPLACE GRATE OR THE LIKE
Donald R. Kerstetter, R.D. No. 1, Cameron County, Emporium, Pa. 15834
Filed May 29, 1975, Ser. No. 581,810
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207



243,227
SEPARABLE STRAP FASTENER
Robert L. Schattner, Baltimore, Md., assignor to Omnimed, Inc., Burlington, N.J.
Filed June 27, 1974, Ser. No. 483,714
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—129

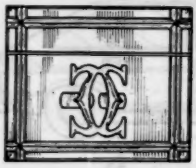


243,228

SEPARABLE LOCK FOR LUGGAGE OR THE LIKE

Alain D. Perrin, Boulogne, France, assignor to Les Must de Cartier-France, Paris, France

Filed May 2, 1975, Ser. No. 573,941
Claims priority, application France, Nov. 4, 1974, 74.30658
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—129



243,229

BOTTLE OR SIMILAR ARTICLE

John W. McDonald, Kansas City, Mo., assignor to Ethyl Development Corporation, Kansas City, Mo.

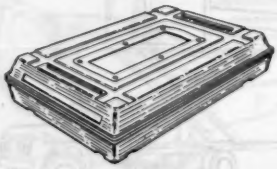
Filed Sept. 25, 1975, Ser. No. 616,856
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—157

243,230

SHIPPING CONTAINER

Wayne E. Kleiner, Mohrsville, Pa., assignor to W. R. Grace & Co., Cryovac Division, Duncan, S.C.

Filed May 19, 1975, Ser. No. 578,683
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—182

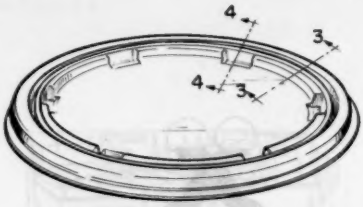


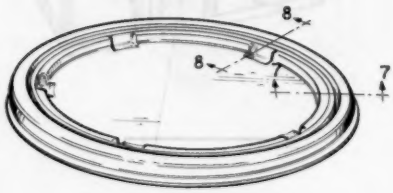
243,231

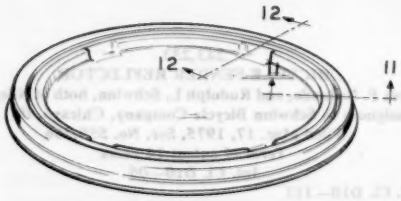
DRINKING CUP LID OR THE LIKE

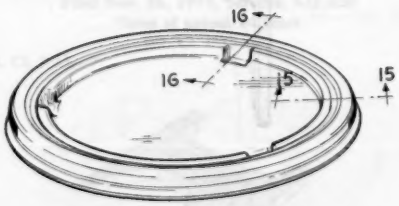
G. Kenneth Smith, Waterville, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed July 28, 1975, Ser. No. 599,749
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—267





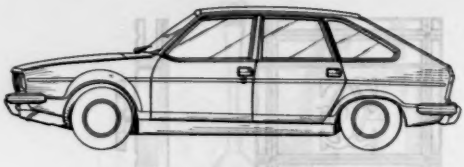


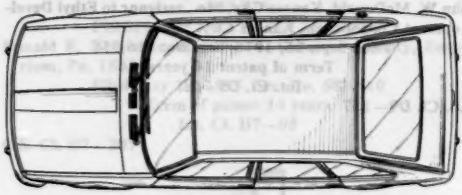


243,232
MOTORCYCLE CHAIN WEAR MEASURING GAGE
Frederick J. Kuenzig, 16 Bob White Way, Simsbury, Conn. 06070
Filed Sept. 16, 1974, Ser. No. 506,727
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—73

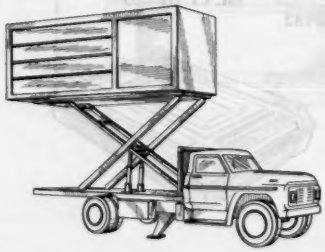
243,233
BICYCLE FENDER REFLECTOR
Frank P. Brilando, and Rudolph L. Schwinn, both of Niles, Ill., assignors to Schwinn Bicycle Company, Chicago, Ill.
Filed Mar. 17, 1975, Ser. No. 559,266
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—111

243,234
CAR
Michel Tixier, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault
Filed July 21, 1975, Ser. No. 597,811
Claims priority, application France, Jan. 29, 1975, 75.73559
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91





243,235
COMBINED VEHICLE WITH MOUNTED SIGN
Seymour Buxbom, Riverside, Calif., assignor to Desert Outdoor Advertising, Inc., Riverside, Calif.
Filed Oct. 24, 1975, Ser. No. 625,465
Term of patent 14 years
Int. Cl.[2] D12—*08*
U.S. Cl. D12—96



243,236

AIR BOX FOR BICYCLES

Roy R. Vachon, Rolling Hills, and John C. Bacardi, Harbor City, both of Calif., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 541,314, Jan. 15, 1975. This application Feb. 27, 1976, Ser. No. 661,972

Term of patent 14 years

Int. Cl. D12—*11*

U.S. Cl. D12—114

243,237

EYEGLASS FRAME

Elfriede Teufelhart, Vienna, Austria, assignor to Optyl Corporation, Norwood, N.J.

Filed Oct. 21, 1975, Ser. No. 624,329

Term of patent 14 years

Int. Cl. D16—*06*

U.S. Cl. D16—65

243,238

ELECTROPHOTOGRAPHIC COPIER-DUPLICATOR

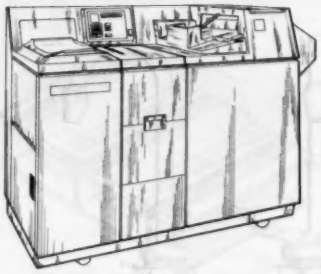
Richard J. Olson, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,926

Term of patent 14 years

Int. Cl. D16—*3*

U.S. Cl. D16—30



243,239

SPRINKLER BASE

William C. Hutton, Worthington; Dale P. Hugo, and Carl A. Rivasi, both of Columbus, all of Ohio, assignors to Amerace Corporation, New York, N.Y.

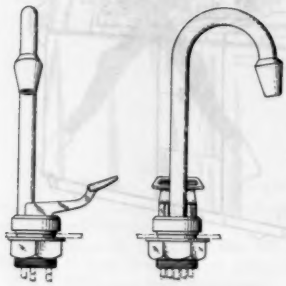
Filed Nov. 26, 1975, Ser. No. 635,620

Term of patent 14 years

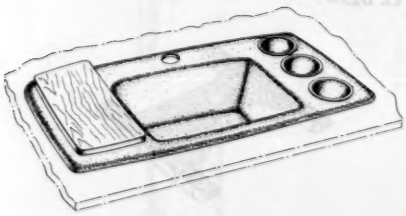
Int. Cl. D23—*01*

U.S. Cl. D23—7

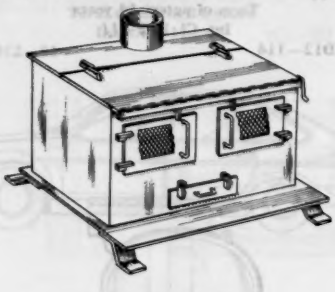
243,240
FAUCET
Richard C. Dreibelbis, Fair Lawn, N.J., assignor to Emerson Electric Co. (H & H Thermostats Division), Cedar Grove, N.J.
Filed Jan. 6, 1976, Ser. No. 646,910
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—25



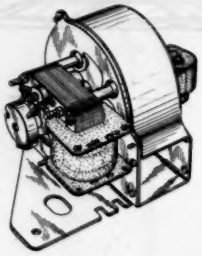
243,241
SINK
Donald W. Doman, Janesville, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Mar. 27, 1975, Ser. No. 562,441
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



243,242
WOOD BURNING STOVE
Lawrence J. Antone, Star Route, Dalton, Mass. 01226
Filed Feb. 6, 1975, Ser. No. 547,567
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—93

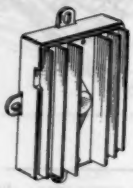


243,243
COMBINED BLOWER AND MOTOR WITH SPEED REDUCTION MEANS THEREFOR
Mutunori Nagao, Katano, and Mitsuaki Utsumi, Moriguchi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Nov. 23, 1973, Ser. No. 418,653
Term of patent 14 years
Int. Cl. D23—*04*; D13—*01*
U.S. Cl. D23—162

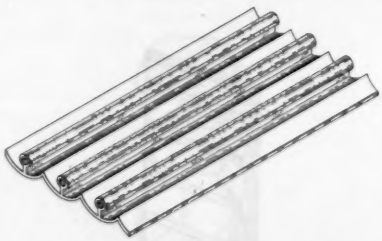


243,244
ELECTRIC PLUG
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Apr. 24, 1975, Ser. No. 571,172
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 B

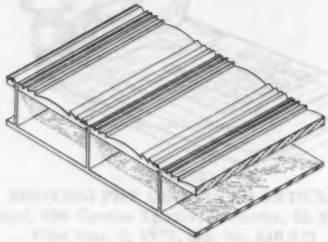
243,245
POWER MODULE FOR ELECTRONIC ENGINE IGNITION SYSTEMS
Craig S. Beshore, 753 Puma Canyon Lane, Glendora, Calif. 91740
Filed Sept. 10, 1975, Ser. No. 611,982
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 R



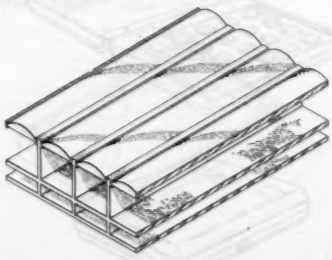
243,246
MULTIPLE CONVERGENCE REFLECTIVE LINEAR OPTICAL AND RECEIVER PLATE FOR SOLAR CONVERSION OR THE LIKE
Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752
Filed Dec. 1, 1975, Ser. No. 636,761
Term of patent 14 years
Int. Cl. D13—*02;* D26—*05*
U.S. Cl. D26—1 R



243,247
CONDENSED MULTIPLE CONVERGENCE LINEAR OPTICAL AND RECEIVER PLATE FOR SOLAR CONVERSION OR THE LIKE
Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752
Filed Dec. 1, 1975, Ser. No. 636,781
Term of patent 14 years
Int. Cl. D13—*02;* D26—*05*
U.S. Cl. D26—1 R



243,248
INTERCHANGEABLE ONE DIMENSIONAL CONVERGENCE LENS SOLAR RADIATION INTENSIFICATION AND CONVECTIVE RECEIVER
Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752
Filed Jan. 21, 1976, Ser. No. 651,098
Term of patent 14 years
Int. Cl. D13—*02;* D26—*05*
U.S. Cl. D26—1 R

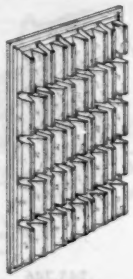


243,249
ELECTRONIC CALCULATING MACHINE
Shigetoshi Hazama, and Masafumi Yamagami, both of Osaka, Japan, assignors to Sharp Corporation
Filed May 27, 1975, Ser. No. 580,833
Claims priority, application Japan, Nov. 29, 1974, 49-42789
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

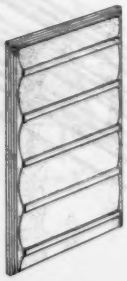
243,250
ELECTRONIC CALCULATING MACHINE
Shigetoshi Hazama, Osaka, Japan, assignor to Sharp Corporation
Filed July 18, 1975, Ser. No. 597,000
Claims priority, application Japan, Jan. 22, 1975, 50-3159
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

243,251
ELECTRONIC CALCULATING MACHINE
Shigetoshi Hazama, and Junichi Sakamoto, both of Osaka, Japan, assignors to Sharp Corporation
Filed Aug. 21, 1975, Ser. No. 606,713
Claims priority, application Japan, Feb. 26, 1975, 50-7850
Term of patent 14 years
Int. Cl.[2] D18—*01*
U.S. Cl. D26—5 C

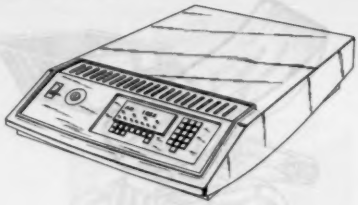
243,252
LOUDSPEAKER GRILLE
Fred C. Tushinsky, Sun Valley, Calif., assignor to Marantz Company, Inc., Chatsworth, Calif.
Filed June 11, 1975, Ser. No. 586,044
Term of patent 3½ years
Int. Cl. D14—*99, 01*
U.S. Cl. D26—14 G



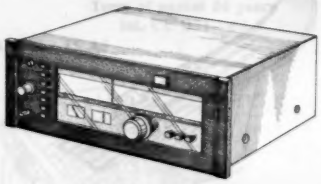
243,253
LOUDSPEAKER GRILLE
John R. Ballantyne, Sun Valley, Calif., assignor to Superscope, Inc., Chatsworth, Calif.
Filed June 11, 1975, Ser. No. 586,045
Term of patent 14 years
Int. Cl. D14—*99, 01*
U.S. Cl. D26—14 G



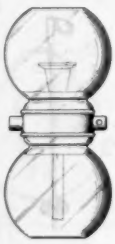
243,254
COMPUTER OR SIMILAR ARTICLE
Dennis C. Coon, Acton, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.
Filed Jan. 19, 1976, Ser. No. 650,205
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



243,255
COMBINED AMPLIFIER AND TUNER
Yoshinobu Asai, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan
Filed June 18, 1975, Ser. No. 588,116
Claims priority, application Japan, Jan. 10, 1975, 50-002041
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 L

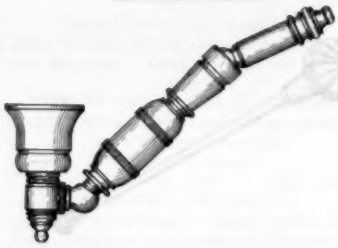


243,256
WATER PIPE CASING
George F. Grihalva, 641 S. Fairview St., Santa Ana, Calif. 92704
Filed Nov. 20, 1974, Ser. No. 525,488
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3

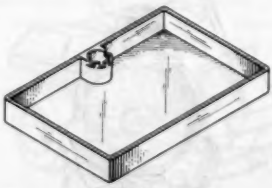


243,257
SMOKING PIPE WITH SWIVEL STEM
David Segal, 906 Gordon Terrace, Winnetka, Ill. 60093
Filed Sept. 5, 1975, Ser. No. 610,620
Term of patent 7 years
Int. Cl. D27—*02*
U.S. Cl. D27—3

243,258
SMOKING PIPE OR SIMILAR ARTICLE
David Segal, 906 Gordon Terrace, Winnetka, Ill. 60093
Filed Sept. 5, 1975, Ser. No. 610,621
Term of patent 7 years
Int. Cl. D27—*02*
U.S. Cl. D27—3



243,259
MICROORGANISM CULTURE TRAY
John E. Martin, Jr., Atlanta, Ga., and Richard Land Jackson, Jr., Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.
Filed Mar. 18, 1974, Ser. No. 451,843
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D32—1 A

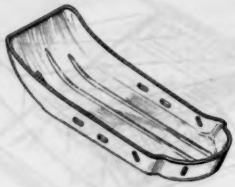


243,260
DOLL OR SIMILAR ARTICLE
Dolores Wycalis, 2360 Sandra Road, Palm Springs, Calif. 92262
Filed Sept. 15, 1975, Ser. No. 613,268
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

243,261
BATON
Donald L. Sartell, 300 S. Wright Road, Janesville, Wis. 53545
Filed July 3, 1975, Ser. No. 592,972
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 BC

243,262
GAME TARGET
Stanley Laut, 1253 E. 73rd St., Brooklyn, N.Y. 11234
Filed Sept. 15, 1975, Ser. No. 613,431
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP

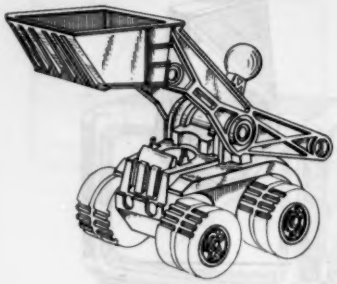
243,263
SNOW SKATE
Jeffrey M. Koblick, Hennepin County, Minn., assignor to K-tel International, Inc., Minn.
Filed Sept. 29, 1975, Ser. No. 617,388
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 D



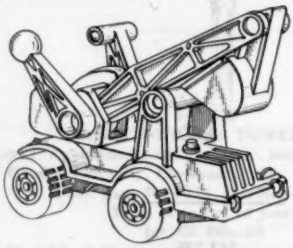
243,264
SNOW SKI
Jeffrey M. Koblick, Hennepin County, Minn., assignor to K-tel International, Inc., Minn.
Filed Sept. 29, 1975, Ser. No. 617,389
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 D

243,265
SKI POLE
Jeffrey M. Koblick, Hennepin County, Minn., assignor to K-tel International, Inc.
Filed Sept. 29, 1975, Ser. No. 617,390
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 D

243,266
TOY LOADER
Jack L. Breneman, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed July 18, 1974, Ser. No. 489,485
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

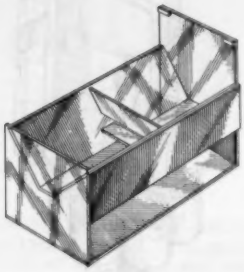


243,267
TOY DIGGER
Jack L. Breneman, Orchard Park, and Jeffrey T. Samson, East Aurora, both of N.Y., assignors to The Quaker Oats Company, Chicago, Ill.
Filed July 31, 1974, Ser. No. 493,254
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



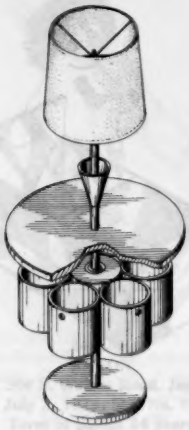
243,268
ROCKING TOY
Julian B. Pearce, Rte. 3, Box 8B, Lyons, Ga. 30436
Filed June 10, 1975, Ser. No. 585,466
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—15 AE

243,269
PLANTER
John Louis Baumgaertner, 9111 Springhill Lane, Greenbelt, Md. 20770
Filed Mar. 31, 1976, Ser. No. 672,393
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—156

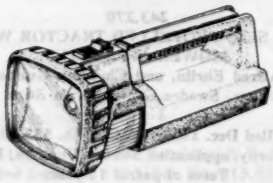


243,270
COMBINED SELF-PROPELLED TRACTOR WITH LAWN MOWER APPARATUS
Hans Tage Alfred Ehrlin, and Christian Gunnar Häggstam, both of Tranas, Sweden, assignors to Stiga AB, Tranas, Sweden
Filed Dec. 18, 1974, Ser. No. 533,784
Claims priority, application Sweden, June 26, 1974, 741062
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—15

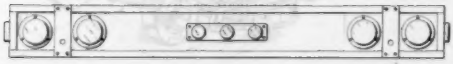
243,271
COMBINED FLOOR LAMP AND CONTAINER FOR KNITTING AND SEWING ARTICLES
Quindora Jan McCuiston, 16016 N. 70th Drive, Peoria, Ariz. 85345
Filed Apr. 16, 1975, Ser. No. 568,791
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 D



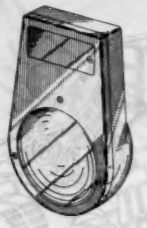
243,272
PORTABLE ELECTRIC LIGHT
Tadahide Okuno, and Masahiro Karaki, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Dec. 13, 1974, Ser. No. 532,487
Claims priority, application Japan, June 19, 1974, 49-20646
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R



243,273
MOBILE HOME TAIL LIGHT ASSEMBLY
Robert W. Braucht, Jersey Shore, Pa., assignor to Capital Housing, Inc., Avis, Pa.
Filed Aug. 20, 1975, Ser. No. 606,626
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 R

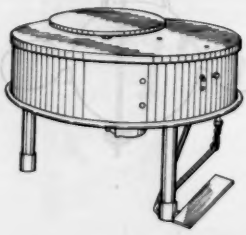


243,274
AUXILIARY LIGHT FOR VEHICLE HAVING ATTACHED PLOWBLADE
Marc L. Micell, Lyndhurst, Ohio, assignor to Meyer Products, Inc., Cleveland, Ohio
Filed Jan. 19, 1976, Ser. No. 650,273
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 R

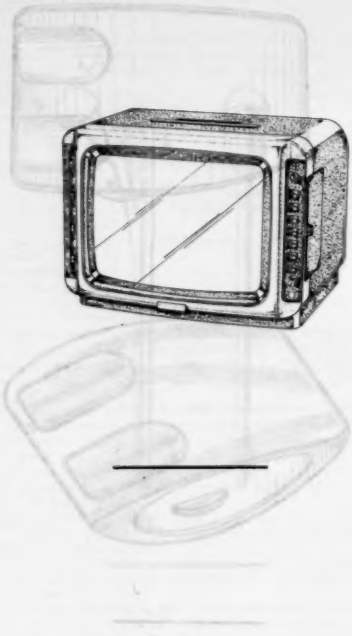


243,275
CULTIVATOR TINE
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland
Filed Nov. 21, 1975, Ser. No. 634,237
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—29

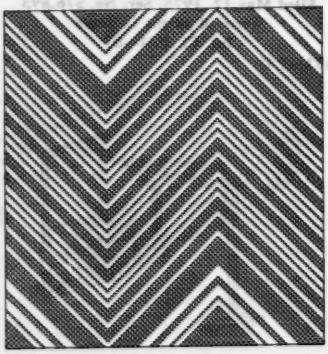
243,276
POTTERS WHEEL
Paul E. Soldner, P.O. Box 917, Aspen, Colo. 81611
Filed Aug. 25, 1975, Ser. No. 607,343
Term of patent 7 years
Int. Cl. D15—*09*
U.S. Cl. D19—35



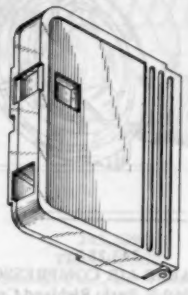
243,277
TELEVISION RECEIVER
Shinichi Sugihara, Suita; Minoru Ando, Uji; Hiroaki Nishiyori, Kyoto; Eiichi Arai, Toyonaka; Fumio Tanaka, Takatsuki, and Takaharu Kabetani, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Dec. 17, 1974, Ser. No. 533,463
Claims priority, application Japan, June 20, 1974, 49-20870
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 D



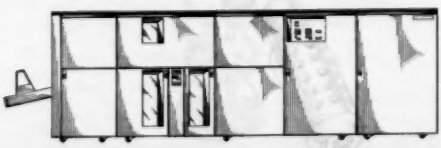
243,278
SHEET OF PAPER TOWELING
Donald T. Appleman, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Aug. 30, 1974, Ser. No. 502,253
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D59—2 B



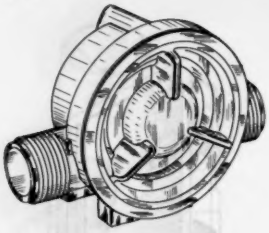
243,279
REUSABLE MICROFILM CARTRIDGE
George W. Bookless, and Casimir S. Samczyk, both of Franklin Park, Ill., assignors to Bell & Howell Company, Chicago, Ill.
Filed Oct. 9, 1973, Ser. No. 404,465
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D26—14 B



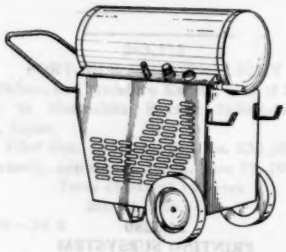
243,280
PRINTING SUBSYSTEM
Joseph Paul Taylor, and David Graham Moore, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 7, 1975, Ser. No. 565,879
Term of patent 14 years
Int. Cl. D18—*02*
U.S. Cl. D64—11 R



243,281
PUMP
Ramon Pareja, Minneapolis, Minn., assignor to Lear Siegler, Inc., Santa Monica, Calif.
Filed July 10, 1975, Ser. No. 594,793
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7

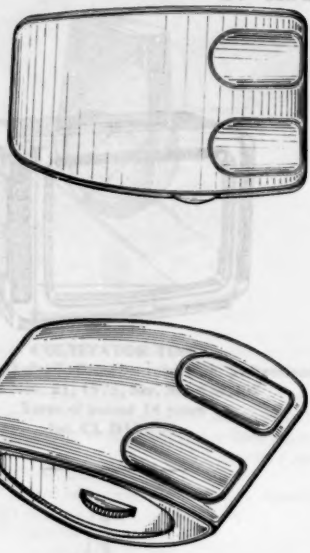


243,282
PORTABLE AIR COMPRESSOR
Thomas I. Burenga, 360 N. Park, Richland Center, Wis. 53581
Filed Sept. 4, 1975, Ser. No. 610,099
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—9

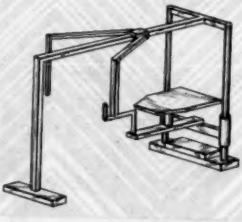


243,283
MEDICAL SUCTION INSTRUMENT TIP
Charles A. Lahay, Fayette, Ala., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Feb. 6, 1975, Ser. No. 547,514
The portion of the term of this patent subsequent to Oct. 19, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—12 A

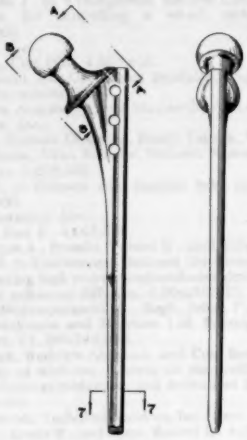
243,284
GALVANIC BIOFEEDBACK SKIN RESPONSE DEVICE
Harold Keith Myers, 4300 DeMaisonneuve Blvd. W., Montreal, Quebec, Canada
Filed Apr. 17, 1975, Ser. No. 569,092
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 F



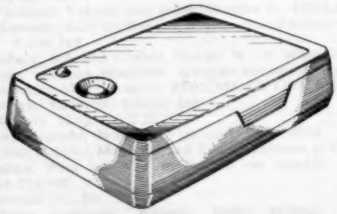
243,285
ORTHOPEDIC SURGICAL TABLE
Robert Langren, 3280 Sterling Ave., Alameda, Calif. 94501
Filed May 12, 1975, Ser. No. 576,893
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 D



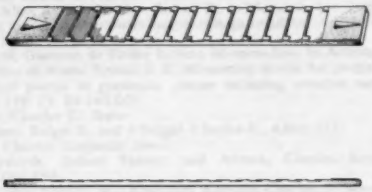
243,286
FEMORAL HIP PROSTHESIS COMPONENT FOR TOTAL AND SUB-TOTAL HIP REPLACEMENT SYSTEMS
William Minor Deyerle, 2222 Monument Ave., Richmond, Va. 23220
Filed June 2, 1975, Ser. No. 582,971
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D83—1 E



243,287
DISINFECTING APPARATUS FOR HYDROPHILIC CONTACT LENSES
Paul A. Hoogesteger, Penfield, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.
Filed July 18, 1975, Ser. No. 597,126
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 W

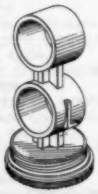


243,288
ORTHOPTIC THERAPY BAR WITH PRISMS
Arthur Jampolsky, Belvedere; Richard J. Kapash, San Rafael; Merton C. Flom; Anthony J. Adams, both of Oakland, and Larry A. Spitzberg, San Rafael, all of Calif., assignors to Optical Sciences Group, Inc., San Rafael, Calif.
Filed Oct. 9, 1975, Ser. No. 620,977
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R



243,289
TRAIN CASE
Daniel Solomon, Denver, Colo., and Thomas D. Tweedie, Monrovia, Calif., assignors to Samsonite Corporation, Denver, Colo.
Filed Mar. 17, 1975, Ser. No. 560,962
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 C

243,290
CONTACT LENS CARRIER
Samuel Loshaek, Chicago, Ill., assignor to Wesley-Jessen Inc., Chicago, Ill.
Filed Jan. 29, 1975, Ser. No. 545,139
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—9



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TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF FEBRUARY, 1977

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A-T-O Inc.: *See—*
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Aanstad, Ola J., to Westinghouse Electric Corporation. Method and apparatus for controlling a steam turbine. 4,005,581, Cl. 60-660.000.

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Abe, Sigeya: *See—*
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Abel, Paul, to Polysius AG. Satellite tube support. 4,005,980, Cl. 432-80.000.

Abex Corporation: *See—*
Frank, Earl E., 4,005,839.

Aboaf, Joseph A.; Broadie, Robert W.; Hull, Edward M.; and Pogge, H. Bernhard, to International Business Machines Corporation. Method for producing high power semiconductor device using anodic treatment and enhanced diffusion. 4,006,045, Cl. 148-187.000.

Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, to Ayerst McKenna and Harrison Ltd. Prostaglandin intermediates. 4,006,136, Cl. 260-240.00R.

Abramovitch, Rudolph Abraham; and Cue, Berkeley Wendell, Jr., to University of Alabama. Process for the synthesis of N-hydroxypyrroles, N-hydroxyimidazoles, and derivatives thereof. 4,006,160, Cl. 260-309.000.

ABS Worldwide Technical Services, Inc.: *See—*
Sullins, James R.; and West, Robert E., 4,006,359.

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Adams, Bertram C. Electrical ground fault detecting device. 4,006,409, Cl. 324-51.000.

Adams, James E.; and Haas, Werner E. L., to Xerox Corporation. Reflective imaging member. 4,005,929, Cl. 350-160.0LC.

Adams, Kenneth: *See—*
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Adelson, Jury Abramovich; and Tamkovich, Oleg Antonovich. Mechanical load handling device for storehouses. 4,005,786, Cl. 214-16.40A.

Adler, Klaus: *See—*
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Aebli, Horst: *See—*
Fleck, Fritz; Balzer, Hans; and Aebli, Horst, 4,006,158.

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Johnson, Jack L.; and Pierotti, Reno U., 4,006,356.

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Air-Tex Wire Harness, Inc.: *See—*
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Airco, Inc.: *See—*
Golahny, Yehuda; and Johns, Douglas A., 4,005,603.
Kennedy, Kurt D.; Erikson, E. Darrell; and Scheuermann, Glen R., 4,006,268.

Aisenberg, Sol; and Chabot, Ronald W., to Whittaker Corporation. Noise rejecting electronic sphygmomanometer and methods for measuring blood pressure. 4,005,701, Cl. 128-2.05G.

Aisin Seiki Kabushiki Kaisha: *See—*
Itakura, Shoji, 4,005,887.

Aizawa, Hiroshi; Iwashita, Tomonori; Fukushima, Tadahide; Iura, Yukio; Uchidoi, Masanori; and Kozuki, Susumu, to Canon Kabushiki Kaisha. Film rewinder mountable on camera. 4,006,489, Cl. 354-214.000.

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Sano, Konosuke; Matsuda, Keizo; Mitsugi, Koji; Yamada, Kazuhiko; Tamura, Fumihide; Yasuda, Naohiko; and Noda, Ichiro, 4,006,057.

Akagawa, Masatake; and Maki, Takeshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Static capacitance type sensor. 4,006,411, Cl. 324-61.00R.

Aktiebolaget Elof Malmberg: *See—*
Hoog, Sivert, 4,005,600.

Alaspa, Allan A.; and Beutler, Robert R., to Motorola, Inc. Integrated circuit having internal main supply voltage regulator. 4,006,491, Cl. 357-23.000.

Albertazzi, Gastone, to Finike Italiana Marposs-Soc. In Accomandita Semplice di Mario Possati & C. Measuring device for gauging mechanical pieces in particular pieces including rotation surfaces. 4,005,528, Cl. 33-143.00F.

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Wilson, Ralph S.; and Albright, Charles E., 4,005,527.

Alcock, Charles Benjamin: *See—*
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Alday, James Marion; and Rowlands, Kenneth Charles, to Remington Arms Company, Inc. Tournament trap. 4,005,695, Cl. 124-8.000.

Alexander, Edwin J.: *See—*
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Allegheny Ludlum Industries, Inc.: *See—*
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Allen-Bradley Company: *See—*
Burton, Lawrence A.; Heuser, Peter; Robinson, Marquis B.; Trendel, Dennis; and Zunft, Donald V., 4,006,440.
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Wise, Walter R.; Allen, Ellsworth J.; and Fisher, Donald K., 4,005,829.

Allen, Raymond P. Photomicrographic illuminator. 4,006,487, Cl. 354-79.000.

Allied Chemical Corporation: *See—*
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Allied Tube & Conduit Corporation: *See—*
Goldberg, Harold D., 4,005,593.

Allis-Chalmers Corporation: *See—*
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Allway Tools Inc.: *See—*
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Alps Electric Co., Ltd.: *See—*
Mega, Yasunori, 4,006,442.

Alsop, Reese Fell. Diagnostic composition and method of using the same. 4,005,984, Cl. 23-230.00B.

Althoff, Gunther: *See—*
Sodomann, Heinrich; Hauschulz, Bruno; and Althoff, Gunther, 4,006,191.

Alverson, Thomas E.: *See—*
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AMAC, Inc.: *See—*
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Amen, Ronald J.: *See—*
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Child, Ralph Grassing; Wilkinson, Raymond George; and Tomcufcik, Andrew Stephen, 4,006,234.
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AMP Incorporated: *See—*
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Anderson, Bruce Conrad: *See—*
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Anderson, Elvin L.; Lam, Bing L.; and Wellman, George R., to Smith-Kline Corporation. Epoxidation of α,β-ethylenic ketones. 4,006,169, Cl. 260-348.00R.

Anderson, Gerald L.; and Kresge, Wilbur R., to Dresser Industries, Inc. Gas service connector for plastic pipe. 4,005,880, Cl. 285-47.000.

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Anderson, Guy C. Humane animal trap. 4,005,542, Cl. 43-85.000.

Andrews, Cecil L. Tightline logging system. 4,005,779, Cl. 212-7.000.

Andrews, Daniel Marshall: *See—*
Brummett, Charles Roscoe; Shaak, Ray Ned; and Andrews, Daniel Marshall, 4,006,047.

Annis, Larry D.: *See—*
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Antoine, Sipic, to Saft-Societe des Accumulateurs Fixes et de Traction; and Compagnie Europeenne d'Accumulateurs. Seal arrangement for a lead terminal with the cover of a storage cell. 4,006,282, Cl. 429-181.000.

Arai, Hiroshi; and Ohta, Jun, to Toyota Jidosha Kogyo Kabushiki Kaisha. Centralized monitor system for motor vehicles. 4,006,448, Cl. 340-52.00F.

ARCO Medical Products Company: *See—*
Purdy, David L., 4,006,038.
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Argabright, Perry A.; Presley, C. Travis; and Wenger, Charles B., to Marathon Oil Company. Polyisocyanurate salt emulsifying agents and derivatives. 4,006,098, Cl. 252-312.000.

Arkansas Rock and Gravel Co.: *See—*
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Australian Iron & Steel Works Proprietary Limited: *See—*
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Raue, Roderich; and Dorsch, Hans-Lothar, 4,006,127.
Siegle, Peter; Kuhle, Engelbert; Zumach, Gerhard; Hammann, Ingeborg; and Homeyer, Bernhard, 4,006,244.
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Bayer, Robert S., to Mosler Safe Company, The. Noise-discriminating voice-switched two-way intercom system. 4,006,310, Cl. 179-1.00H.

Bayley, Donald S.: *See—*
Greenwood, Ivan A.; and Bayley, Donald S., 4,006,405.

Beadle, Howard C.; and Gibbs, Irving, to R. T. Vanderbilt Company, Inc. Stabilized epihalohydrin polymers. 4,006,119, Cl. 260-45.75N.

Bearingwall Systems Inc.: *See—*
Sommers, Alex, 4,005,972.

Beatrice Foods Co.: *See—*
Kyros, George C., 4,006,256.

Beck, Henry Nelson, to Dow Chemical Company, The. Alpha iron (III) oxide crystals and derivatives. 4,006,090, Cl. 252-62.560.

Becker, Danny J.; Boggs, Roger L.; Vaughn, Kennith E.; and Shuler, James Richard, to Caterpillar Tractor Co. Low ground pressure track shoe. 4,005,912, Cl. 305-13.000.

Becker, Robert D.; and Kaderka, Freddie S., to Grover Smith Mfg. Co. Spray gun quickly convertible between air and airless operating modes. 4,005,824, Cl. 239-289.000.

Becker, Robert W.: *See—*
Boldt, Melvin H.; Chuboff, David P.; and Becker, Robert W., 4,006,300.

Beduchaud, Michel: *See—*
de Loye, Martin; and Beduchaud, Michel, 4,005,933.

Beecham Group Limited: *See—*
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,006,237.

Behr, Erich; and Wolfes, Wolfgang, to Dynamit Nobel Aktiengesellschaft. Thermostable polyester. 4,006,120, Cl. 260-47.00C.

Beier, Gerhard: *See—*
Bauer, Johann; Adler, Klaus; Beier, Gerhard; Hefner, Heinz; and Sabel, Alex, 4,006,201.

Belknap Corporation: *See—*
Baldwin, Bruce B., 4,005,806.

Bell Telephone Laboratories, Incorporated: *See—*
Candy, James Charles; Freeny, Stanley Leon; and Ninke, William Herbert, 4,006,475.
Condon, Joseph Henry; and Kieburtz, Robert Bruce, 4,006,314.
Danielsen, Daniel; Dunlap, Kermit Shoff; Haugk, George; and Sanderson, Richard Barton, 4,006,307.
Sell, Darrell Dean, 4,006,304.
Simpson, Harold A.; and Thompson, Edwin C., 4,006,437.

Beloit Corporation: *See—*
Frair, William J.; and Langdon, Robert P., 4,005,827.
Phillips, Irvin J., 4,005,676.

Bendall, Wilfrid H. Automatic variable speed transmission. 4,005,609, Cl. 74-230.17S.

Bendix Corporation, The: *See—*
Barnard, Daniel Dewey, 4,005,689.
Lanni, Michael J.; Calamera, John; Krebs, Leon; and O'Connor, Bernard J., 4,005,608.
Slavin, Michael; Bata, George T.; Emery, Raymen F.; and Ludwig, George C., 4,005,821.
Welsh, Harold H., Jr., 4,005,639.

Bengtson, R. W., to Foster Wheeler Energy Corporation. Scheduling tool. 4,006,345, Cl. 235-69.000.

Benken, William B.: *See—*
Berger, Kenneth L.; Amen, Ronald J.; Nassar, Jorge J.; and Benken, William B., 4,006,253.

Bennett, Donald R., to Dow Corning Corporation. Anticonvulsant diphenylsilanes. 4,006,226, Cl. 424-184.000.

Bennett, Glenn Edward, to AMP Incorporated. Electro-acoustic surface-wave filter device. 4,006,438, Cl. 333-72.000.

Berg, Kaare W. N.: *See—*
Bakke, Even A.; and Berg, Kaare W. N., 4,005,755.

Berger, Herbert; Gall, Rudi; Stach, Kurt; Vomel, Wolfgang; and Hoffmann, Rita, to Boehringer Mannheim G.m.b.H. Nitroimidazolyltriazolo-pyridazine compounds. 4,006,141, Cl. 260-250.0AC.

Berger Industries, Inc.: *See—*
Berger, Sidney; Buda, Salvatore; and Weintraub, Burton, 4,005,879.

Berger, Kenneth L.; Amen, Ronald J.; Nassar, Jorge J.; and Benken, William B., to Syntex (U.S.A.) Inc. Process for NPN ruminant feed supplement. 4,006,253, Cl. 426-69.000.

Berger, Sidney; Buda, Salvatore; and Weintraub, Burton, to Berger Industries, Inc. Conduit joint. 4,005,879, Cl. 285-31.000.

Beriger, Ernst, to Ciba-Geigy Corporation. Pesticidally active thio- and dithiophosphoric acid esters. 4,006,228, Cl. 424-212.000.

Bernady, Karel Francis; Poletto, John Frank; and Weiss, Martin Joseph, to American Cyanamid Company. 1-Alkoximino-2-(ω-substituted alkyl)-2-cyclopentenes. 4,006,179, Cl. 260-468.00J.

Berry, Willis E., to National Union Electric Corporation. Mounting means for the rotatable brush roll of a suction cleaner. 4,005,501, Cl. 15-339.000.

Beseke, Kermit Myles; Johannsen, James Robert; and Chapman, Ronald Howard, to Motorola, Inc. Analog to digital converter for asynchronous detector. 4,006,454, Cl. 340-146.10R.

Besser Industries, Inc.: *See—*
Werner, John A., 4,005,591.

Bessho, Hironori: *See—*
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Bethlehem Steel Corporation: *See—*
Fisher, Thomas W.; Rauch, Stewart E., Jr.; and Steinbicker, Richard N., 4,006,213.

Beutler, Robert R.: *See—*
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Bhuchar, Vishwa Mitra; Agrawal, Arun Kumar; Kiss, Franz; Vasisht, Jayanti Prasad; Parkash, Dharam; and Srivastava, Oudh Narain Lal, to Council of Scientific and Industrial Research. Still extractor with novel stopcock means. 4,006,062, Cl. 202-169.000.

Bickford, William J.: *See—*
Liskov, Nathan A.; Bickford, William J.; and Tanzi, Paul J., 4,006,418.

Bickoff, Emanuel M.; de Fremery, Donald; Edwards, Richard H.; Knuckles, Benny E.; Kohler, George O.; and Miller, Raymond E., to United States of America, Agriculture. Preparation of soluble edible protein from leafy green crops. 4,006,078, Cl. 210-23.00F.

Bien, Hans-Samuel: *See—*
Majer, Norbert; Bien, Hans-Samuel; Judat, Helmut; and Lieberam, Armin, 4,006,171.

Bieser, Herbert J., to UOP Inc. Process for separating normal paraffins. 4,006,197, Cl. 260-676.0MS.

Billottet, Henri: *See—*
Narbaits-Jaureguy, Jean-Raymond; and Billottet, Henri, 4,006,447.

Biocel Corporation: *See—*
Penque, Ronald A., 4,006,006.

Birk, Silvia C.; Collins, Samuel H.; and Wilson, Peggy M., to Mobil Oil Corporation. Oil recovery by surfactant waterflooding. 4,005,749, Cl. 166-273.000.

Bishop, Thomas G., to Koehring Company. Injection-mold clamping unit having alternately ejecting die assemblies. 4,005,964, Cl. 425-242.00R.

Bjerk, Roger O.: *See—*
Goloff, Alexander; and Bjerk, Roger O., 4,005,950.

Bjertnaes, Gunnar. Ski construction of the torsion box type. 4,005,875, Cl. 280-610.000.

Black, Allan Lindsay; and Fukuto, Tetsuo Roy, to University of California, The Regents of the. N-aminosulfenylated derivatives of carbofuran. 4,006,231, Cl. 424-248.500.

Blair, Gerard M.: *See—*
Hewitt, William D.; Diffrient, Roy S.; Bajackson, Richard A.; and Blair, Gerard M., 4,006,460.

Blake, James A.: *See—*
Catlett, John C.; and Blake, James A., 4,006,392.

Blaupunkt-Werke GmbH: *See—*
Liman, Helmut, 4,006,419.

Bleh, Otto: *See—*
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Blickenstaff, John E.: *See—*
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Blinov, Jury Ivanovich: *See—*
Juganson, Elmar Juganovich; Chernyavsky, Isaak Yakovlevich; Ivantsov, Vladimir Yakovlevich; Blinov, Jury Ivanovich; Ustyantsev, Vladimir Petrovich; and Klestov, Igor Alexeevich, 4,005,741.

Block Engineering, Inc.: *See—*
Mueller, William A., 4,006,360.

Bloom, Stanley M.; Borror, Alan L.; and Greenwald, Richard B., to Polaroid Corporation. Precursors of β-aza-disubstituted amino styryl dyes. 4,006,151, Cl. 260-294.80F.

Blythe Colours (Australia) Proprietary Ltd.: *See—*
Robinson, Ian George, 4,006,279.

Board, David A., Jr., to New Hampshire Ball Bearings, Inc. Method of preparing a low-friction laminate liner for bearings. 4,006,051, Cl. 156-247.000.

Bochal, Karel: *See—*
Hrabak, Frantisek; and Bochal, Karel, 4,006,147.

Bochis, Richard J., to Merck & Co., Inc. Anthelmintic benzimidazoles with improved aqueous stability. 4,006,153, Cl. 260-302.00H.

Boehringer Ingelheim GmbH: *See—*
Keck, Johannes; Noll, Klaus-Reinhold; Pieper, Helmut; Kruger, Gerd; and Puschmann, Sigfrid, 4,006,246.

Boehringer Mannheim G.m.b.H.: *See—*
Berger, Herbert; Gall, Rudi; Stach, Kurt; Vomel, Wolfgang; and Hoffmann, Rita, 4,006,141.

Boeing Company, The: *See—*
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,005,835.

Boffa, Gioacchino; and Mazzaferro, Nicola, to Montedison Fibre S.p.A. 5-Aza-7-thiadibenzocrysene derivatives. 4,006,146, Cl. 260-272.000.

Boggs, Roger L.: *See—*
Becker, Danny J.; Boggs, Roger L.; Vaughn, Kennith E.; and Shuler, James Richard, 4,005,912.

Bogri, Tibor: *See—*
Abraham, Nedumparambil A.; Bagli, Jehan F.; and Bogri, Tibor, 4,006,136.

Bogut, Henry A., to Motorola, Inc. Universal battery charging apparatus. 4,006,396, Cl. 320-2.000.

Bohner, Beat; Dawes, Dag; Kny, Hermann; Meyer, Willy; and Perchais, Jean, to Ciba-Geigy Corporation. Process for the preparation of 1,2,4-triazole derivatives. 4,006,157, Cl. 260-308.00R.

Boldt, Melvin H.; Chuboff, David P.; and Becker, Robert W., to Zenith Radio Corporation. Two-piece back for a console television receiver. 4,006,300, Cl. 358-254.000.

Bolgiano, Duane Ridgely, to International Mobile Machines Corporation. Code-controlled detection and function actuating system. 4,006,316, Cl. 179-84.00R.

Bollinger, Frederic G.; and D'Amico, John J., to Monsanto Company. N-(Substituted phenyl) derivatives of saccharin. 4,006,007, Cl. 71-76.000.

Bone, David Palmer; and Shannon, Edward Leo, to Quaker Oats Company, The. Process for making a dry pet food having a hard component and a soft component. 4,006,266, Cl. 426-623.000.

Bonnemann, Helmut; and Schenkluhn, Hartmut, to Studiengesellschaft Kohle M.b.H. Catalytic production of pyridines from alkynes and nitriles. 4,006,149, Cl. 260-290.00P.

Bonomo, Melvin E., to Unverferth Manufacturing Company, Inc. Dual wheel mounting assemblies. 4,005,907, Cl. 301-36.00R.

Booher, Robert K., to Rockwell International Corporation. Detector circuit. 4,006,458, Cl. 340-147.00R.

Borcoman, Mircea. Production line for forming concrete elements. 4,005,963, Cl. 425-218.000.

Borg-Warner Corporation: *See—*
Ball, Rowland E., 4,005,747.
Gritter, David James, 4,006,398.
Studtmann, George Henry, 4,006,399.
Zambrow, John L.; Hempel, Rudolph M.; and Feng, Louis T., 4,006,016.

Borror, Alan L.: *See—*
Bloom, Stanley M.; Borror, Alan L.; and Greenwald, Richard B., 4,006,151.

Borsuk, Pavel Afanasievich: *See—*
Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; Kuznetsov, Viktor Georgievich; Kagan, Naum Yakovlevich; Razumeev, Jury Alexeevich; Bortnik, Vladimir Mironovich; Korenbljum, Isai Volfovich; and Dmitrieva, Valentina Alexeevna, 4,006,027.

Bortnik, Vladimir Mironovich: *See—*
Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; Kuznetsov, Viktor Georgievich; Kagan, Naum Yakovlevich; Razumeev, Jury Alexeevich; Bortnik, Vladimir Mironovich; Korenbljum, Isai Volfovich; and Dmitrieva, Valentina Alexeevna, 4,006,027.

Botello, Ramon J., to AMAC, Inc. Apparatus for detecting rail discontinuities. 4,005,601, Cl. 73-146.000.

Bouille, Joseph R., to Westinghouse Electric Corporation. Transportation device having movable handrails. 4,005,773, Cl. 198-335.000.

Bouwhuis, Gijsbertus; Braat, Josephus Johannes Maria; Greve, Peter Ferdinand; and Immink, Kornelis Antonie, to U.S. Philips Corporation. Apparatus for reading a flat record carrier with an optically readable information structure. 4,006,293, Cl. 358-128.000.

Bouyoucos, John V.; Selsam, Roger L.; and Courtright, Dennis R., to Hydroacoustics Inc. Hydroacoustic apparatus and valving mechanisms for use therein. 4,005,637, Cl. 91-276.000.

Bowman, David A., to Honeywell Information Systems, Inc. Error-correctible bit-organized RAM system. 4,006,467, Cl. 340-173.00R.

Box, Harold Eugene. Recording chart. 4,006,483, Cl. 346-77.00R.

Boyden, Robert E., to Schwend, Fred N., a part interest. Normally closed wafer thin switch. 4,006,336, Cl. 200-246.000.

Boyer, Carl William: *See—*
Alper, Allen Myron; Boyer, Carl William; and Martin, Brice Eugene, 4,006,212.

Braat, Josephus Johannes Maria: *See—*
Bouwhuis, Gijsbertus; Braat, Josephus Johannes Maria; Greve, Peter Ferdinand; and Immink, Kornelis Antonie, 4,006,293.

Brackmann, Warren A.; and Dilanni, Daniel, to Rothmans of Pall Mall Canada Limited. Tobacco stream manufacture. 4,005,717, Cl. 131-84.00R.

Bragg, Kenneth R. Tool for flossing teeth under a permanent bridge. 4,005,722, Cl. 132-92.00R.

Brandes, Gunter: *See—*
Wegner, Hans-George; Kruger, Wolfgang; Sochtig, Gunter; and Brandes, Gunter, 4,006,077.

Brenet, Jean: *See—*
Faber, Peter; and Brenet, Jean, 4,006,217.

Brickerd, Millard S., Jr., to United States of America, Navy. Voice operated relay. 4,006,309, Cl. 179-1.0VC.

Bridgestone Tire Company Limited: *See—*
Furukawa, Junji; Kobayashi, Eiichi; and Kawagoe, Takahiro, 4,006,113.

Bro-Dart Inc.: *See—*
Ingram, Harold M., 4,005,797.

Broadie, Robert W.: *See—*
Aboaf, Joseph A.; Broadie, Robert W.; Hull, Edward M.; and Pogge, H. Bernhard, 4,006,045.

Brochu, Adrien: *See—*
Brochu, Andre; and Brochu, Adrien, 4,005,625.

Brochu, Andre; and Brochu, Adrien. Tree slasher. 4,005,625, Cl. 83-100.000.

Brock, Gordon L.: *See—*
Olsen, Dick Merlin; Armstrong, Charles H.; and Brock, Gordon L., 4,006,403

Brock, James Donald, to Astec Industries, Inc. Multistage progressive drying method. 4,005,979, Cl. 432-8.000.

Brody, Thomas P.: *See—*
Luo, Fang-Chen; Brody, Thomas P.; and Davies, David H., 4,006,383.

Broken Hill Proprietary Company Limited, The: *See—*
Swinkels, Dominicus Adrianus Johannes, 4,005,951.

Brooks & Perkins, Incorporated: *See—*
Mollon, Leslie; and Ball, Keith R., 4,006,362.

Brown, Bertrand Hirsch; DeTolla, Francis Louis; and Reilly, Dale Robert, to United Technologies Corporation. Method and apparatus for controlling stator thermal growth. 4,005,946, Cl. 415-136.000.

Brown, Gordon W.: *See—*
Roe, Norman P.; and Brown, Gordon W., 4,006,289.

Brown, Leon Henry, Jr.; and Peters, David H., to Wangco Incorporated. Transducer positioner. 4,006,372, Cl. 310-13.000.

Brummett, Charles Roscoe; Shaak, Ray Ned; and Andrews, Daniel Marshall, to AMP Incorporated. Catalysts for electroless deposition of metals on comparatively low-temperature polyolefin and polyester substrates. 4,006,047, Cl. 156-656.000.

Bruning, Harvey R., to North American Philips Corporation. Variable disc capacitor. 4,006,389, Cl. 317-249.00D.

Brunswick Corporation: *See—*
Davis, James Arthur, 4,005,674.

Bryant, Richard C. Dual directional and brake light control for trailers. 4,006,453, Cl. 340-67.000.

Bubacz, Dennis S.; Hoffmann, Guenter F.; and Schiecke, Konrad L., to Zenith Radio Corporation. Yoke adjusting apparatus for a color TV picture tube. 4,006,301, Cl. 358-248.000.

Bubnash, Terry L.; and Haldane, John C., Jr., to Ford Motor Company. Dust shield for disc brake. 4,005,768, Cl. 188-218.00A.

Bucalo, Louis. Methods and apparatus for use in magnetic treatment of the body. 4,005,699, Cl. 128-1.300.

Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, to Beecham Group Limited. Tetrahydrocarbostyril derivatives for the prophylaxis of asthma, hayfever and rhinitis. 4,006,237, Cl. 424-258.000.

Buckner, Spencer P., to TRW Inc. Flapper valve with independent spring action. 4,005,732, Cl. 137-512.100.

Buda, Salvatore: *See—*
Berger, Sidney; Buda, Salvatore; and Weintraub, Burton, 4,005,879.

Buonomo, Franco: *See—*
Tesei, Renato; Fattore, Vittorio; and Buonomo, Franco, 4,006,198.

Burford, Wm. E.: *See—*
Cress, Howard D., 4,005,820.

Burkhart, James G.; Burkhart, Montgomery P.; and Coley, James D., to Air-Tex Wire Harness, Inc. Replaceable electrical connector plug assembly. 4,005,922, Cl. 339-59.00M.

Burkhart, Montgomery P.: *See—*
Burkhart, James G.; Burkhart, Montgomery P.; and Coley, James D., 4,005,922.

Burn, William H., to Pocket Socks Corporation, The. Pocket sock and method of knitting same. 4,005,494, Cl. 2-239.000.

Burnham, Robert D.: *See—*
Streifer, William; Scifres, Donald R.; and Burnham, Robert D., 4,006,432.

Burnitt, John E.: *See—*
Cofer, Daniel B.; Chia, Enrique Calixta; Burnitt, John E.; and Kaltenberg, Theodor W., 4,005,744.

Burroughs Wellcome Co.: *See—*
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,006,235.

Burton, James A.; and Marsh, Gerald A., to HydroTech International, Inc. Ring set ball coupling. 4,005,881, Cl. 285-111.000.

Burton, Lawrence A.; Heuser, Peter; Robinson, Marquis B.; Trendel, Dennis; and Zunft, Donald V., to Allen-Bradley Company. Terminal structure for electromagnetic contactor. 4,006,440, Cl. 335-132.000.

Butler, John R.; and Scott, Patricia M., to Raytheon Company. Magnetron filter. 4,006,382, Cl. 315-39.530.

Butler, Larry G., to Purdue Research Foundation. Hydrophobic noncovalent binding of proteins to support materials. 4,006,059, Cl. 195-68.000.

C.D.B. Europ: *See—*
McLean, Nathan Cosh, 4,005,590.

Calabretta, Peter J.; and Keppel, Frank J., to Felton International, Inc. Candle wax composition. 4,005,978, Cl. 431-288.000.

Calamera, John: *See—*
Lanni, Michael J.; Calamera, John; Krebs, Leon; and O'Connor, Bernard J., 4,005,608.

Caldecott, Ross: *See—*
Young, Jonathan D.; Davis, Curtis W., III; Peters, Leon, Jr.; and Caldecott, Ross, 4,006,481.

Calderazzo, Fausto; Pasquali, Marco; and Garibaldi, Pierpaolo, to Snam Progetti S.p.A. Process for the preparation of uranium (IV) chelated compounds and thorium chelated compounds. 4,006,174, Cl. 260-429.100.

Caldwell, Edward N. Thermally responsive ventilated cold frame. 4,005,547, Cl. 47-28.00R.

Calle, Jaime: *See—*
Patterson, Garvin Wesley; Shelly, William A.; Calle, Jaime; and Monahan, Earnest M., 4,006,466.

Calspan Corporation: *See—*
Schneider, Clayton J., Jr.; Washburn, Harold A.; and Blickenstaff, John E., 4,005,659.

Cambardella, Mario: *See—*
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Cambridge Thermionic Corporation: *See—*
Lyman, Frank, Jr.; and McDonald, William C., 4,006,375.

Campbell Industries: *See*—
Zaninovich, John; and Stipich, Ante, 4,005,670.

Campbell, Kenneth J.; and Mogle, Douglas H., to United States of America, Navy. Digital display system circuit. 4,006,412, Cl. 324-96.000.

Campbell, Steven James, to Gehl Company. Blade sharpening device for rotatable chopping cylinders. 4,005,554, Cl. 51-249.000.

Canada Wire and Cable Limited: *See*—
Kerfoot, Derek G. E., 4,006,269.

Canadian Industries Limited: *See*—
Gannon, David John, 4,006,014.

Candy, James Charles; Freeny, Stanley Leon; and Ninke, William Herbert, to Bell Telephone Laboratories, Incorporated. Digital-to-analog converter with digitally distributed amplitude supplement. 4,006,475, Cl. 340-347.0DA.

Canfield, Earl H., to Wellington Machine Co. Plain bearing. 4,005,915, Cl. 308-36.00R.

Canino, Lawrence S., to MCA Disco-Vision, Inc. Transducer head assembly with fluid bearing and head height control system. 4,006,294, Cl. 358-127.000.

Cannady, Daniel L., Jr.; and Palazzolo, Salvatore E., to Westinghouse Electric Corporation. Reverse printed high-pressure laminates. 4,006,048, Cl. 156-90.000.

Canon Kabushiki Kaisha: *See*—
Aizawa, Hiroshi; Iwashita, Tomonori; Fukushima, Tadahide; Iura, Yukio; Uchidoi, Masanori; and Kozuki, Susumu, 4,006,489.
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Cantello, Barrie Christian Charles: *See*—
Buckle, Derek Richard; Cantello, Barrie Christian Charles; and Smith, Harry, 4,006,237.

Cappotto, Samuel D.; and Dodge, John E., to SCM Corporation. Speed retarding governor. 4,005,771, Cl. 197-64.000.

Carlisle, Richard W.: *See*—
Sebesta, George J.; Hofer, Alan; and Carlisle, Richard W., 4,006,318.

Carlson, Allen William, to Dart Industries Inc. Flame retardant polypropylene compositions. 4,006,114, Cl. 260-28.50D.

Carlson, Drexel T. Vapor reactor. 4,005,999, Cl. 55-93.000.

Carlson, Elmer V., to Industrial Research Products, Inc. Transducer coupling system. 4,006,321, Cl. 179-180.000.

Carlson, Eric J.: *See*—
Yost, Russell R., Jr.; and Carlson, Eric J., 4,006,477.

Carlsson, Stig. Stereophonic sound reproducing apparatus. 4,006,311, Cl. 179-1.0GA.

Carpenter Technology Corporation: *See*—
Muzyka, Donald R.; and Schlosser, Donald K., 4,006,011.

Carreras Rothmans Limited: *See*—
Prouse, Ronald Earnest; West, Anthony Alfred; King, Derek Anthony; and Poulson, Roger, 4,005,718.

Carrero, Alfred V., to Lawrence Peska Associates, Inc., a part interest. Air propulsion device for surface craft. 4,005,673, Cl. 115-1.00C.

Carrier Communications, Inc.: *See*—
Halstead, William S., 4,006,315.

Carter, David: *See*—
Augstein, Joachim; Carter, David; and Lee, Thomas Brian, 4,006,245.

Carvalho, Thomas W.: *See*—
deVos, Hendrik A. J.; and Carvalho, Thomas W., 4,006,354.

Casanova Valero, Jose Maria, to Compania Hispano Americana de Construcciones Conserveras S.A. Chaconsa. Peduncled vegetable and fruit positioning device. 4,005,774, Cl. 198-384.000.

Case, Charles B.: *See*—
Bateman, Allen H.; Case, Charles B.; Kragness, David W.; and LeDuc, Edward C., 4,005,626.

Casey, Thomas Patrick, to J. I. Case Company. Foot pedal assembly with a return spring. 4,005,616, Cl. 74-512.000.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See*—
Heinrich, Ernst; Kindler, Horst; and Ribka, Joachim, 4,006,129.

Caterpillar Tractor Co.: *See*—
Ball, Glen A.; Koch, Keith E.; Lamport, Ivan R.; and Untz, Robert W., 4,005,896.
Becker, Danny J.; Boggs, Roger L.; Vaughn, Kennith E.; and Shuler, James Richard, 4,005,912.
Goloff, Alexander; and Bjerk, Roger O., 4,005,950.
Westervelt, Ralph; and Fratzke, Lawrence F., 4,006,083.

Catlett, John C.; and Blake, James A. Electronic sliding door. 4,006,392, Cl. 318-266.000.

Caton, William M., to United States of America, Navy. Broad bandwidth optical modulator and switch. 4,005,927, Cl. 350-96.0WG.

Catotti, Arthur J.; Hodgman, John S.; and Mullersman, Ferdinand H., to General Electric Company. Controlled battery charger system. 4,006,397, Cl. 320-31.000.

Celanese Corporation: *See*—
Koermer, Gerald S., 4,006,190.

Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement: *See*—
Gaucher, Antoine; and Guilhot, Gerard, 4,006,043.

Ceres Pharmacal Company: *See*—
Upham, John S.; Grybek, R. Scott; and Raulerson, Theodore R., Jr., 4,006,219.

Ceskoslovenska akademie ved: *See*—
Hrabak, Frantisek; and Bochal, Karel, 4,006,147.
Jokl, Jan, 4,006,350.

Cha, Chang Yul, to Occidental Petroleum Corporation. Method of igniting in situ oil shale retort with fuel rich flue gas. 4,005,752, Cl. 166-260.000.

Chabot, Ronald W.: *See*—
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Chagra, Lee A.: *See*—
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Chaliha, Indrajit. Wire take-up assembly. 4,005,831, Cl. 242-82.000.

Chamberlain, George H. N., to Signco Limited. Peg boards. 4,005,539, Cl. 40-143.000.

Champion Home Builders Co.: *See*—
MacDonald, Robert D.; and Rose, Robert K., 4,005,748.

Chan, Jimmy H.; and Pitt, Harold M., to Stauffer Chemical Company. Process for the manufacture of geranyl chloride. 4,006,196, Cl. 260-654.00R.

Chance, Leon H.; and Morris, Cletus E., to United States of America, Agriculture. Phosphinyl guanidine derivatives. 4,006,203, Cl. 260-940.000.

Chance, Leon H.; Timpa, Judy D.; and Drake, George L., Jr., to United States of America, Agriculture. 2,4,6-Tris(carbamoylmethylamino)-1,3,5,-s-triazine. 4,006,274, Cl. 427-381.000.

Chang, Mike F.: *See*—
Cline, Harvey E.; Anthony, Thomas R.; and Chang, Mike F., 4,006,040.

Chang, Yu-Wen Y.; Kuno, Hiromu J.; and Chao, Pei Y., to Hughes Aircraft Company. Dielectric image guide integrated mixer/detector circuit. 4,006,425, Cl. 329-160.000.

Chao, Pei Y.: *See*—
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Chapman, Ronald Howard: *See*—
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Charette, Raymond O.; and Konczak, Hank A., to United States of America, Air Force. Antenna window assembly for ablative heat shields. 4,006,480, Cl. 343-705.000.

Charkoudian, John C., to Polaroid Corporation. Method for reducing zinc oxide content of zinc particles. 4,006,036, Cl. 427-123.000.

Charlton, Andrew Paul; Lewis, Kenneth Dan; Willus, Charles Arthur; and Nyrop, Per, to Dorr-Oliver Incorporated. Nozzle type centrifuge. 4,005,817, Cl. 233-22.000.

Chen, Augustin T.; and Farrissey, William J., Jr., to Upjohn Company, The. Polyester-amides prepared from polymalonates and isocyanates. 4,006,122, Cl. 260-75.0TN.

Chernyavsky, Isaak Yakovlevich: *See*—
Juganson, Elmar Juganovich; Chernyavsky, Isaak Yakovlevich; Ivantsov, Vladimir Yakovlevich; Blinov, Jury Ivanovich; Ustyantsev, Vladimir Petrovich; and Klestov, Igor Alexeevich, 4,005,741.

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Cofer, Daniel B.; Chia, Enrique Calixta; Burnitt, John E.; and Kaltenberg, Theodor W., 4,005,744.

Chiba, Yoshitaka: *See*—
Watanabe, Rikizo; and Chiba, Yoshitaka, 4,006,015.

Chibnik, Sheldon, to Mobil Oil Corporation. Polyoxyethylene polyamine mannich base products and use of same in fuels and lubricants. 4,006,089, Cl. 252-51.50R.

Child, Ralph Grassing; Wilkinson, Raymond George; and Tomcufcik, Andrew Stephen, to American Cyanamid Company. Substituted 2-benzofuranyl propenones as anti-tubercular agents. 4,006,234, Cl. 424-251.000.

Childress, Scott J., to American Home Products Corporation. Systemic treatment of psoriasis. 4,006,250, Cl. 424-326.000.

Chin, Clinton G.: *See*—
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Chiselko, John J.; and Hulbert, William H., to Egan Machinery Company. Method for additive feeding. 4,006,209, Cl. 264-211.000.

Chitulescu, Irina; and Costachel, Octav, to Spitalul Clinic Filantropia Bucuresti. Drug composition intended for the treatment of acute, lethal and chronic radiation disease. 4,006,223, Cl. 424-177.000.

Christensen, Robert I.; and Gould, George D., to Chevron Research Company. Process for the production of low-sulfur-content hydrocarbon mixtures. 4,006,076, Cl. 208-211.000.

Chromalloy-Alcon, Inc.: *See*—
Schultz, Ronald L., 4,005,524.

Chrysler Corporation: *See*—
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Chuboff, David P.: *See*—
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Clay, Scott Douglas. Vacuum hair cutter. 4,005,526, Cl. 30-133.000.
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Cline, Harvey E.; Anthony, Thomas R.; and Chang, Mike F., to General Electric Company. Semiconductor device manufacture. 4,006,040, Cl. 148-1.500.
Cofer, Daniel B.; Chia, Enrique Calixta; Burnitt, John E.; and Kaltenberg, Theodor W., to Southwire Company. Apparatus for continuous pickling of cast rod. 4,005,744, Cl. 164-270.000.
Cohen, William A., to Sphero International Co. Transmission with continuously variable speed ratio. 4,005,618, Cl. 74-640.000.
Colato, Albert E.; and Formo, Jerome L., to Anchor Hocking Corporation. Apparatus for storing, refrigerating and heating food items. 4,005,745, Cl. 165-2.000.
Colautti, Franco, to Kinglor Metor S.p.A. Means for withdrawing sponge iron from retorts. 4,005,857, Cl. 266-191.000.
Coley, James D.: *See—*
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Comfort Products, Inc.: *See—*
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Commercial Resins Company: *See—*
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Compagnie Europeenne d'Accumulateurs: *See—*
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Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
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Compagnie Industrielle des Lasers: *See—*
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Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
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Mermoz, Henri, 4,006,421.
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Condon, Joseph Henry; and Kieburtz, Robert Bruce, to Bell Telephone Laboratories, Incorporated. Digital interface for resynchronizing digital signals. 4,006,314, Cl. 179-15.0BS.
Connlab Holdings Limited: *See—*
Micetich, Ronald G.; Chin, Clinton G.; and Morin, Robert B., 4,006,139.
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Constant, James Nickolas. Recursive filter implemented as a matched clutter filter. 4,006,351, Cl. 235-152.000.
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Simonsen, Harald; Specht, Hans; Baumgartel, Klaus; and Meumann, Hans, 4,005,610.
Coon, James A. File forming press. 4,005,597, Cl. 72-380.000.
Coors Container Company: *See—*
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Corbiere, Claude. Textured yarn. 4,005,569, Cl. 57-140.00J.
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Coulter, J. Roland; and Fuerherm, Arthur E., to Tull Aviation Corporation. System for transmitting operating condition data from a passive station to a central station. 4,006,461, Cl. 340-163.000.
Coulter, Raymond Arthur, to AMP Incorporated. Vacuum cleaner hose terminal applicator. 4,005,517, Cl. 29-748.000.
Council of Scientific and Industrial Research: *See—*
Bhuchar, Vishwa Mitra; Agrawal, Arun Kumar; Kiss, Franz; Vasisht, Jayanti Prasad; Parkash, Dharam; and Srivastava, Oudh Narain Lal, 4,006,062.
Courtot, Louis B., to Weatherhead Company, The. Tilt responsive valve. 4,005,724, Cl. 137-38.000.
Courtright, Dennis R.: *See—*
Bouyoucos, John V.; Selsam, Roger L.; and Courtright, Dennis R., 4,005,637.
Cousse, Henri; and Mouzin, Gilbert, to Pierre Fabre S.A. Process for the obtaining of esters of acetylsalicylic acid and amino alcohols. 4,006,181, Cl. 260-474.000.
Cox, David A.; and Shroot, Braham, to Pfizer Inc. 7-D-(α-acylamino-arylacetamido)-cephalosporanic acid derivatives. 4,006,230, Cl. 424-246.000.
CPC International Inc.: *See—*
Gooding, Chester Martin, 4,006,264.
Craddy, Richard Adrian, to Masson Scott Thrissell Engineering Limited. Rotary cutter drums. 4,005,627, Cl. 83-674.000.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. [1,3-Dihydroxy-2-substituted and 2,2-disubstituted-indanyloxy-(or thio)]alkanoic acids. 4,006,180, Cl. 260-473.00F.
Crawford, William V., to Phillips Petroleum Company. Pipe end reforming apparatus. 4,005,968, Cl. 425-384.000.
Creagh, Linda Truitt: *See—*
Kmetz, Allan Robert; and Creagh, Linda Truitt, 4,005,928.
Cress, Howard D., to Burford, Wm. E., a part interest. Furnace apparatus and process for control thereof. 4,005,820, Cl. 236-1.00G.
Creusot-Loire: *See—*
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Crist, Harold; and Crist, Robert A., to Raymond Lee Organization, Inc., The, a part interest. Shoe protection device. 4,005,534, Cl. 36-72.00R.
Crist, Robert A.: *See—*
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Crookston, Ronald W.; Alverson, Thomas E.; and Soles, Otto H., to Westinghouse Electric Corporation. Convection heating apparatus for multi-phase gas-type circuit interrupters. 4,006,332, Cl. 200-148.00E.
Cross, Jon L.; Homan, Merle Edward; Machol, Guenther Keith; Malm, Richard La Verne; and Svelund, Larry Eugene, to International Business Machines Corporation. Apparatus for control and data transfer between a serial data transmission medium and a plurality of devices. 4,006,465, Cl. 340-172.500.
Crosslen, Louis John, to Frank Mayer & Associates, Inc. Display case for use with a merchandise display rack. 4,005,775, Cl. 206-45.180.
Crouch, Donald W., to General Electric Company. Vacuum interrupter for high voltage applications. 4,006,331, Cl. 200-144.00B.
Crouch, William B., to Texaco Inc. Manufacture of gaseous mixtures comprising hydrogen and carbon monoxide. 4,006,100, Cl. 252-373.000.
Crouch, William B.: *See—*
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Cuda, John; and Sordello, Frank J., to Information Storage Systems, Inc. Coarse and fine control for position servo. 4,006,394, Cl. 318-594.000.
Cue, Berkeley Wendell, Jr.: *See—*
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Cullings, Harold L. Rotational grapple. 4,005,895, Cl. 294-65.500.
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Cyclops Corporation: *See—*
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Dach, Hansjorg; and Marion, Robert, to Zahnradfabrik Friedrichshafen AG. Hydraulic gear-shift control for automotive transmission systems. 4,005,620, Cl. 74-865.000.
Dahms, Harald. Method and apparatus for colorimetric analysis. 4,005,983, Cl. 23-230.00R.
Dahms, Wolfgang, to Schering Aktiengesellschaft. Method of improving the tarnish resistance of silver. 4,006,026, Cl. 106-14.000.
Daicel, Ltd.: *See—*
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Daido Metal Company, Ltd.: *See—*
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Daiga, Valdis R., to Owens-Illinois, Inc. Process for melting glass. 4,006,003, Cl. 65-135.000.

Dalgleish, Jack Frank; and Lukas, Helmut Hans, to Northern Telecom Limited. Method of connecting two optical fibres in end to end relationship. 4,005,522, Cl. 29-517.000.

D'Amico, John J.: *See—*
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Danielsen, Daniel; Dunlap, Kermit Shoff; Haugk, George; and Sanderson, Richard Barton, to Bell Telephone Laboratories, Incorporated. Impulse noise suppression circuit. 4,006,307, Cl. 179-1.00P.

Darling, Myron E., to B.J.D. Industries. Tuning key for stringed instruments. 4,005,628, Cl. 84-304.000.

Dart Industries Inc.: *See—*
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Davis, Curtis W., III: *See—*
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Davis, George B., Jr. Christmas tree lighting series. 4,005,923, Cl. 339-157.00C.

Davis, James Arthur, to Brunswick Corporation. Pivot position sensing apparatus. 4,005,674, Cl. 115-41.00R.

Davis, James F. Progressively revealed display. 4,005,535, Cl. 40-30.000.

Dawes, Dag: *See—*
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DDSA Pharmaceuticals: *See—*
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Deering, Charles S.; and Redmond, William G., to E-Systems, Inc. Linearized pulse width modulator. 4,006,391, Cl. 318-227.000.

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DeGryse, Gentiel M.: *See—*
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Dehn, Rudolph A., to General Electric Company. Microwave heating apparatus with improved multiple couplers and solid state power source. 4,006,338, Cl. 219-10.55F.

DeLille, Richard A.; Curnan, William A.; and DeGryse, Gentiel M., to Gulf & Western Industries, Inc. Magnetic return mechanism. 4,005,819, Cl. 235-144.0ME.

de Loye, Martin; and Beduchaud, Michel, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Copying and telecopying device. 4,005,933, Cl. 355-66.000.

Delta Metal Electronics Limited: *See—*
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Demag Aktiengesellschaft: *See—*
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Denton, Dennis N., to Garlock Inc. Method of molding a seal with balanced pressures on a preform. 4,006,210, Cl. 264-250.000.

Denton, Thomas James, to Combustion Engineering, Inc. Fluid distribution system. 4,006,087, Cl. 210-289.000.

De Polo, Karl-Fred: *See—*
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De Santis, Pietro; and Pucci, Fioravante, to Selenia-Industrie Elettroniche Associate S.p.A. Microstrip circulator operating in the peripheral mode and having non-uniform biasing means. 4,006,434, Cl. 333-1.100.

Detex Corporation: *See—*
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DeTolla, Francis Louis: *See—*
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Wegner, Hans-George; Kruger, Wolfgang; Sochtig, Gunter; and Brandes, Gunter, 4,006,077.

Devenish, Graham Frampton; and Dickson, Peter Christopher, to Dunlop Limited. Resilient structures. 4,005,943, Cl. 404-41.000.

De Visser, Christian, to General Electric Company. Reset for threaded enclosure. 4,005,615, Cl. 74-504.000.

deVos, Hendrik A. J.; and Carvalho, Thomas W., to GTE Sylvania Incorporated. Low-profile lighting fixture. 4,006,354, Cl. 240-51.11R.

Dickson, Peter Christopher: *See—*
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Didier-Werke AG: *See—*
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Diffrient, Roy S.: *See—*
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Di Maio, Anthony E.; and Todisco, Joseph G., to Marson Fastener Corporation. Apparatus for setting blind rivets. 4,005,519, Cl. 29-818.000.

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Donner, Donald L. Parachute toy. 4,005,544, Cl. 46-86.00R.

Door Controls Incorporated: *See—*
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Dorr-Oliver Incorporated: *See—*
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Dorsch, Hans-Lothar: *See—*
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Dow Corning Corporation: *See—*
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Doyle, Richard H.; Morabito, Salvatore L.; Yohana, Andrew I.; and Novak, Raymond F., to Duo-Fast Corporation. Electric fastener driving tool. 4,005,812, Cl. 227-131.000.

Drabek, Jozef, to Ciba-Geigy AG. Insecticidal and acaricidal trihalophenyl thiophosphates. 4,006,229, Cl. 424-225.000.

Drake, George L., Jr.: *See—*
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Dreibelbis, Richard C., to Emerson Electric Co. (H & H Thermostats Div). Multi-control valve dispensing head and heated and chilled water dispensing system utilizing the same. 4,005,804, Cl. 222-144.500.

Dresser Industries, Inc.: *See—*
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Dreznes, John J.: *See—*
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Driscoll, Norman Joseph, to Yudin Industries, Inc. Audio signal processing apparatus. 4,006,306, Cl. 179-1.0GQ.

Drori, Mordechai. Pipe coupling. 4,005,884, Cl. 285-323.000.

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Dubois, Michel, to Linden-Alimak AB. Excavating machine. 4,005,905, Cl. 299-31.000.

Duggan, Gene. Monitor and safety device for coil shifting circuit. 4,006,386, Cl. 317-5.000.

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Dunlap, Kermit Shoff: *See—*
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Dunlop Limited: *See—*
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Dunn, Donnell L., to J. I. Case Company. Hydraulic system for a working machine. 4,005,636, Cl. 91-31.000.

Duo-Fast Corporation: *See—*
Doyle, Richard H.; Morabito, Salvatore L.; Yohana, Andrew I.; and Novak, Raymond F., 4,005,812.

Du Pont de Nemours, E. I., and Company: *See—*
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Edwards, Earl S., to McClain Industries Inc. Trash compactor. 4,005,648, Cl. 100-53.000.
Edwards, Richard H.: *See—*
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Eggleston, Philip W., to Fisher Controls Company, Inc. Bidirectional pressure-assisted valve seal. 4,005,848, Cl. 251-173.000.
Ehmann, Hans; and Klein, Gunther, to GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung. Pneumatic blind riveter with cascaded pistons. 4,005,598, Cl. 72-391.000.
Eichelberger, Edward Baxter; and Robbins, Gordon Jay, to International Business Machines Corporation. High density semiconductor chip organization. 4,006,492, Cl. 357-45.000.
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Ekman, Curt Olof, to AB Bofors. Method and apparatus for raising a collapsible screen mounted on a vehicle such as a tank. 4,005,634, Cl. 89-36.00H.
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Ensanian, Minas. Method for measuring surface characteristics of metals and metalloids. 4,006,063, Cl. 204-1.00T.
Erickson, Henry, to Atlantic Richfield Company. Reforming with a platinum-alumina catalyst. 4,006,074, Cl. 208-138.000.
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Niebylski, Leonard M.; and Rifkin, Ellis B., 4,005,993.
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Etter, Berwyn E. Means for applying additives to industrial gas. 4,006,205, Cl. 261-39.00R.
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Fabregas, Juan Brugarolas; and Gruber, Frederic. One step film-forming phosphatization of metallic surfaces and composition for effecting same. 4,006,041, Cl. 148-6.160.
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Faroni, Charles C., to Assembly Line Products, Inc. Fastener apparatus. 4,005,623, Cl. 81-426.000.
Farr, Glyn Phillip Reginald, to Lucas Industries Limited. Solenoid-operated valve. 4,005,759, Cl. 180-65.00R.
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Faxas, Juan Sebastian. Single or multiple furrow sugar cane planting machine. 4,005,805, Cl. 222-178.000.
Fedor, Robert J.; and Ogden, Cameron S., to Gould Inc. NO_x reduction catalyst for internal combustion engine emission control. 4,006,105, Cl. 252-465.000.
Feldcamp, Edward George. Methods and equipment for machining electrodes. 4,005,635, Cl. 90-11.00C.
Feldmann, Herman F., to Syngas Recycling Corporation. Process and apparatus for converting solid wastes to pipeline gas. 4,005,994, Cl. 48-111.000.
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Fett, Darrell L.; Fulkerson, David E.; and Geske, Marvin L., to Honeywell Information Systems, Inc. Reference voltage regulator. 4,006,400, Cl. 323-19.000.
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Files, James Harold, to Regal Tool & Rubber Co. Inc. Bumper with cushion pivot at bottom. 4,005,672, Cl. 114-219.000.
Filippeschi, Rolando, to Acciaierie Di Piombino S.p.A. Device for rotating rails and rolled sections about their longitudinal axes. 4,005,781, Cl. 214-1.0QG.
Finger, Eugene P., to Curtis Instruments, Inc. Fast reset integrator. 4,006,415, Cl. 324-182.000.
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Fisher, Thomas W.; Rauch, Stewart E., Jr.; and Steinbicker, Richard N., to Bethlehem Steel Corporation. Halogen tin electrodeposition bath sludge treatment. 4,006,213, Cl. 423-92.000.
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Flaherty, John J.; and Strauts, Eric J., to Magnaflux Corporation. Non-destructive testing systems having automatic balance and sample and hold operational modes. 4,006,407, Cl. 324-40.000.
Fleck, Fritz; Balzer, Hans; and Aebli, Horst, to Sandoz Ltd. Fluorescent 1,2,3-triazole derivatives of 3-phenylcoumarin. 4,006,158, Cl. 260-308.00B.
Fletcher-Terry Company, The: *See—*
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Folk, Craig L., to United States of America, Agriculture. Self-cleaning open-end yarn spinning apparatus. 4,005,568, Cl. 57-56.000.
Foner, Simon; McNiff, Edward J., Jr.; and Alexander, Edwin J., to United States of America, Energy Research and Development Administration. Method of producing ternary lead molybdenum sulfides. 4,006,107, Cl. 252-518.000.
Ford Motor Company: *See—*
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Foster, Thomas W., to Fibreboard Corporation. Carton with integral overwrap. 4,005,814, Cl. 229-39.00R.
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Fowler, Herbert H. Thermomagnetic valve. 4,005,726, Cl. 137-119.000.
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Frair, William J.; and Langdon, Robert P., to Beloit Corporation. Refiner disk. 4,005,827, Cl. 241-261.300.
Frank, Earl E., to Abex Corporation. Railroad turnouts. 4,005,839, Cl. 246-415.00R.
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Freeman, Billy P. Batch transfer system. 4,005,908, Cl. 302-3.000.
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French, Hollis E.; and Kruse, Juergen M., to Itek Corporation. Abrasion resistant coating for polycarbonate substrates. 4,006,271, Cl. 427-164.000.
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Gallegos, Alfred J.; and Cortes-Gallegos, Vincente. Compositions and methods for fertility control. 4,006,227, Cl. 424-195.000.
Gandhi, Haren S.; Shelef, Mordecai; Stepien, Henryk K.; and Yao, Hsin C., to Ford Motor Company. Stabilized rhenium catalyst. 4,006,102, Cl. 252-454.000.
Ganguly, Ashit K.; and Sarre, Olga, to Schering Corporation. Method of using reduction products of everninomicins as antibacterial agents and pharmaceutical compositions useful therefor. 4,006,225, Cl. 424-180.000.
Gannon, David John, to Canadian Industries Limited. Use of tetraalkylammonium halides as flotation collectors. 4,006,014, Cl. 75-2.000.
Garaty, John Francis, to Australian Iron & Steel Works Proprietary Limited. Roof bolt injection mast. 4,005,811, Cl. 227-124.000.
Gardner, David L. Pipe coating apparatus. 4,006,049, Cl. 156-195.000.
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Gartner, Todd H., to GTE Automatic Electric Laboratories Incorporated. Foreign potential checker. 4,006,319, Cl. 179-175.30R.
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Gelfand, Samuel, to Hooker Chemicals & Plastics Corporation. Process for the catalytic production of dichlorotoluenes. 4,006,195, Cl. 260-650.00R.

Gellerstedt, Nils Goran; and Stradalen, Yngve Bertil, to AB Bofors. Device for a pyrotechnical flare body comprising a flame spreader for the flame emitted by the flare body. 4,005,656, Cl. 102-35.600.

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Gerretz, Josef; and Rehag, Klaus, to Wean United, Inc. Feeding workpiece apparatus for cold pilger rolling mills. 4,005,595, Cl. 72-250.000.

Gerry, Martin E. Tape cassette. 4,006,493, Cl. 360-132.000.

Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, to Boeing Company, The. Automatic flight control means for rotary wing aircraft having attitude-air speed control. 4,005,835, Cl. 244-17.130.

GESIPA Blindniettechnik Gesellschaft mit beschrankter Haftung: *See—*
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Moutou, Paul-Cyril; and Godart, Jean-Jacques, 4,006,490.

Goegelman, Robert T.: *See—*
Kahan, Jean S.; Kahan, Frederick M.; Stapley, Edward O.; Goegelman, Robert T.; and Hernandez, Sebastian, 4,006,060.

Goeke, Alfons; and Riedel, Franz, to Th. Kieserling & Albrecht. Metal peeling machine with movable clamping carriage. 4,005,624, Cl. 82-20.000.

Golahny, Yehuda; and Johns, Douglas A., to Airco, Inc. Apparatus for measuring fluid flow. 4,005,603, Cl. 73-194.00M.

Goldberg, Harold D., to Allied Tube & Conduit Corporation. Bending clamp. 4,005,593, Cl. 72-213.000.

Goldberg, Joshua I.: *See—*
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,005,835.

Goloff, Alexander; and Bjerk, Roger O., to Caterpillar Tractor Co. Bearings for slant axis rotary mechanisms. 4,005,950, Cl. 418-53.000.

Goodbary, Edgar R.: *See—*
Myers, Walter I.; Goodbary, Edgar R.; Thomas, Richard L.; Lewis, Billy W.; and Bartley, Francis A., 4,005,850.

Goodbary Engineering Co.: *See—*
Myers, Walter I.; Goodbary, Edgar R.; Thomas, Richard L.; Lewis, Billy W.; and Bartley, Francis A., 4,005,850.

Goodfellow, Anthony Gerald, to Dunlop Limited. Manufacture of moulded articles. 4,006,053, Cl. 156-394.000.

Gooding, Chester Martin, to CPC International Inc. Preparation of confectioners' fats. 4,006,264, Cl. 426-607.000.

Goodley, George F.; Woomer, William H.; Inamdar, Udaykumar B.; and Gallagher, Robert L., to FMC Corporation. Strapping machine. 4,005,647, Cl. 100-4.000.

Goodrich, Philip C. Pedal-operated volume control. 4,006,441, Cl. 338-153.000.

Gorinas, Guy, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Device for the rapid depositing of oxides in thin layers which adhere well to plastic supports. 4,006,340, Cl. 219-121.00P.

Gorman, John E., to Shell Oil Company. Separation process. 4,005,998, Cl. 55-84.000.

Gottlieb, Sheldon K. Compositions and methods useful for repairing depressed cutaneous scars. 4,006,220, Cl. 424-101.000.

Gould, George D.: *See—*
Christensen, Robert I.; and Gould, George D., 4,006,076.

Gould Inc.: *See—*
Fedor, Robert J.; and Ogden, Cameron S., 4,006,105.
Mao, George W., 4,006,035.

Government Innovators: *See—*
Stragier, Marcel G.; and Peterson, Theodore J., 4,005,791.

Grace, Henry A.; and Conrad, Robert G. Golf putting training method. 4,005,870, Cl. 273-183.00R.

Grafton, David A., to Xerox Corporation. Flat field scanning system. 4,006,299, Cl. 358-293.000.

Gralak, Bruce G., to Quaker Oats Company, The. Process for preparing protein supplemented, flavored instant grits. 4,006,255, Cl. 426-72.000.

Gralak, Bruce George, to Quaker Oats Company, The. Protein supplemented, flavored instant grits. 4,006,254, Cl. 426-72.000.

Grant, Whitney I., to Vilter Manufacturing Corporation. Variable capacity rotary screw compressor. 4,005,949, Cl. 418-15.000.

Green, Charles E.: *See—*
Tirpak, Michael R.; Schouten, James J.; and Green, Charles E., 4,006,037.

Greene, Leonard M., to Safe Flight Instrument Corporation. Aircraft altitude alerting device. 4,006,472, Cl. 340-181.000.

Greenwald, Richard B., to Polaroid Corporation. Alkylsulfonyl methyl-substituted pyridine N-oxides. 4,006,150, Cl. 260-294.80F.

Greenwald, Richard B.: *See—*
Bloom, Stanley M.; Borror, Alan L.; and Greenwald, Richard B., 4,006,151.

Greenwood, Ivan A.; and Bayley, Donald S., to Singer Company, The. Method and apparatus for measuring parameters of a conductive material which can be used in independently determining thickness and conductivity. 4,006,405, Cl. 324-34.0TK.

Greve, Peter Ferdinand: *See—*
Bouwhuis, Gijsbertus; Braat, Josephus Johannes Maria; Greve, Peter Ferdinand; and Immink, Kornelis Antonie, 4,006,293.

Gringer, Donald, to Allway Tools Inc. Retractable cutting implement. 4,005,525, Cl. 30-125.000.

Gritter, David James, to Borg-Warner Corporation. Excitation system for multi-phase induction generator. 4,006,398, Cl. 322-47.000.

Grogler, Gerhard: *See—*
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Gross, Alexander Louis: *See—*
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Grover Smith Mfg. Co.: *See—*
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Groves, David Rennie Kingsley: *See—*
Mikkelsen, Jorgen; Groves, David Rennie Kingsley; and Herbert, Peter John, 4,005,795.

Gruber, Frederic: *See—*
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Grundy, Reed H., to Westinghouse Air Brake Company. Circuit arrangement for controlling the propulsion, braking and station stopping function for a rapid transit train. 4,005,837, Cl. 246-182.00B.

Grundy, Reed H., to Westinghouse Air Brake Company. Station stop and speed regulation system for trains. 4,005,838, Cl. 246-182.00B.

Grybek, R. Scott: *See—*
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GTE Automatic Electric Laboratories Incorporated: *See—*
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GTE Laboratories Incorporated: *See—*
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GTE Sylvania Incorporated: *See—*
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deVos, Hendrik A. J.; and Carvalho, Thomas W., 4,006,354.
Kelsey, Paul V., Jr., 4,006,097.
Momberger, Richard A.; and Williams, G. Norman, 4,006,290.
Guardian Packaging Corporation: *See—*
Monia, Victor, 4,006,275.
Guenin, Andre, to La Nationale S.A. Elastic hinge for a pair of spectacles. 4,005,930, Cl. 351-113.000.
Guest, John Derek. Tube couplings. 4,005,883, Cl. 285-322.000.
Guettier, Michel: *See—*
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Guile, Donald L.; and Smith, Robert K., to Corning Glass Works. Hydration resistant fused dolomitic grain and production method therefor. 4,006,029, Cl. 106-58.000.
Guilhot, Gerard: *See—*
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Gulf & Western Industries, Inc.: *See—*
DeLille, Richard A.; Curnan, William A.; and DeGryse, Gentiel M., 4,005,819.
Gunderson, Ralph R. Traction control device. 4,005,760, Cl. 180-74.000.
Gundlach, Robert W., to Xerox Corporation. Process for shallow relief printing. 4,005,654, Cl. 101-426.000.
Gunther Papenmeier KG, Maschinen-und Apparatebau: *See—*
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Gussack, Mark C. Oxidation-reduction process. 4,006,067, Cl. 204-151.000.
Guthrie, Robert William; and Kierstead, Richard Wightman, to Hoffmann-La Roche Inc. Hydroxycitric acid derivatives. 4,006,166, Cl. 260-343.600.
Gutman, Arnold D., to Stauffer Chemical Company. Heterocyclic substituted thio and sulfonyl glyoxylinitrileoxime phosphates and phosphonates. 4,006,154, Cl. 260-302.00E.
Gutman, David. Drill guide. 4,005,945, Cl. 408-115.00B.
H. H. Robertson Company: *See—*
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H. Vaessen B.V.: *See—*
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Haage, Karl: *See—*
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Haas, Werner E. L.: *See—*
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Habelt, Gerhard, to U.S. Philips Corporation. Marking device for a recording apparatus. 4,005,871, Cl. 274-1.00R.
Habu, Nobuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine. 4,005,684, Cl. 123-30.00D.
Hadden, Edward Leal; and Evans, Robert Franklin, to Du Pont de Nemours, E. I., and Company. Transmission cable connector and termination method. 4,005,921, Cl. 339-14.00R.
Haeussler, Alfred H. K. Strip and wire straightener roll. 4,005,592, Cl. 72-165.000.
Halbach, Edward A.: *See—*
Gallatin, Paul M.; and Halbach, Edward A., 4,006,322.
Haldane, John C., Jr.: *See—*
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Hall, Rotrou Alan; Jones, William Edward; and Subramanian, Kohur Nagaraja, to International Nickel Company, Inc., The. Recovering iron, nickel, or cobalt from sulfate solution. 4,006,215, Cl. 423-142.000.
Halstead, William S., to Carrier Communications, Inc. Inductive-carrier communication systems. 4,006,315, Cl. 179-82.000.
Hamesch, Muwaffak: *See—*
Forthmann, Rudiger; Hamesch, Muwaffak; and Nickel, Hubertus, 4,006,096.
Hamilton, Stephen P., to Texas Instruments Incorporated. Error correction system in a programmable calculator. 4,006,455, Cl. 340-146.10F.
Hamm, Reiner: *See—*
Diessel, Paul; Helfert, Herbert; Hamm, Reiner; and Scharpenberg, Hans-Georg, 4,006,093.
Hammann, Ingeborg: *See—*
Siegle, Peter; Kuhle, Engelbert; Zumach, Gerhard; Hammann, Ingeborg; and Homeyer, Bernhard, 4,006,244.
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Hanawalt, Larry D., to Shafer Valve Company. Cross-over port construction for hydraulic motors. 4,005,642, Cl. 92-122.000.
Handle, Frank, to Karl Handle & Sohne, Maschinenfabrik und Eisengiesserei. Kneading device for clay and similar materials. 4,005,855, Cl. 259-185.000.
Haney, Thomas E.: *See—*
Smith, Richard A.; and Haney, Thomas E., 4,006,262.
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Hanley Company: *See—*
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Hannah, John: *See—*
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Hannemann, Dieter: *See—*
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Hanratty, Emmett A. Blinker practice light. 4,006,305, Cl. 178-115.000.
Harbert, Charles A.: *See—*
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Harper, William P.: *See—*
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Harris Corporation: *See—*
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Harris, Marvin K. Tamping apparatus. 4,005,944, Cl. 404-133.000.
Harris, William Harvey: *See—*
Rosen, Arnold; and Harris, William Harvey, 4,005,703.
Hart, Robert J., to Commercial Resins Company. Apparatus for circumnavigating a dispenser about a pipe or the like. 4,005,677, Cl. 118-307.000.
Hartford Fibres Ltd.: *See—*
Laird, William F., 4,006,277.
Hasbro Development Corporation: *See—*
Ptaszek, George W.; and King, James A., 4,005,545.
Haugk, George: *See—*
Danielsen, Daniel; Dunlap, Kermit Shoff; Haugk, George; and Sanderson, Richard Barton, 4,006,307.
Haugwitz, Rudiger D.; and Maurer, Barbara V., to E. R. Squibb & Sons, Inc. 2-Ethenyl imidazolium derivatives. 4,006,137, Cl. 260-240.00D.
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Haumaier, Robert, to Haumaier Automotive Energy Saver, Inc. Vehicle drive unit utilizing hydraulic pump and motor. 4,005,577, Cl. 60-431.000.
Hausberger, Arthur L.; and Hammons, Gene A., to El Paso Natural Gas Company. Methanation process for the production of an alternate fuel for natural gas. 4,005,996, Cl. 48-197.00R.
Hauschulz, Bruno: *See—*
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Hawkins, William Edward, to Du Pont de Nemours, E. I., and Company. Process and apparatus for importing coherence to tow. 4,005,566, Cl. 57-34.00B.
Hayao, Shin; Havera, Herbert John; and Strycker, Wallace Glenn, to Miles Laboratories, Inc. Therapeutic method of treating cardiac arrhythmias utilizing 3-substituted diphenylhydantoins. 4,006,232, Cl. 424-250.000.
Hayashi, Tadashi; and Nisimura, Isao, to Nissan Motor Co., Ltd.; and Omron Tateisi Electronics Co. Pneumatic tire pressure sensing switch. 4,006,327, Cl. 200-61.250.
Hayashi, Takeshi: *See—*
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Hayashi, Yoshio: *See—*
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Hazeltine Corporation: *See—*
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Head, Glenn Dale: *See—*
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Healthways: *See—*
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Heath, Christopher Edmund James; Paton, Anthony David; and Reeve, David Anthony, to Imperial Chemical Industries Limited. Pattern printing apparatus. 4,006,482, Cl. 346-75.000.
Hebel, Rudolf: *See—*
Palz, Helmut; Hebel, Rudolf; and Bauersachs, Otto, 4,005,982.
Heckert, David C.; and Watt, David M., Jr., to Procter & Gamble Company, The. Organosilane compounds. 4,006,176, Cl. 260-448.20N.
Heeks, John Stuart, to International Standard Electric Corporation. Surface acoustic wave delay lines. 4,006,436, Cl. 333-30.00R.
Hefner, Heinz: *See—*
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Heim Universal Company, The: *See—*
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Hein, Piet, to Stiftung fuer Humaniora und Wissenschaft. Puzzle. 4,005,868, Cl. 273-156.000.
Heinrich, Ernst; Kindler, Horst; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. 2-Nitro-4-aliphaticoxy-phenylazo-2,6-dihydroxy-3-cyano-4-methylpyridine compounds. 4,006,129, Cl. 260-156.000.

Heintz, Clifford E.: *See—*
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Hellman, Robert R.; and Mikita, Marion T., to Westport Development & Mfg. Co. Inc. Switch for sensing a selected ratio between two different pressures. 4,006,329, Cl. 200-83.00D.

Hempel, Rudolph M.: *See—*
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Henrichsen, Robert Brent. Fishing leader tender. 4,005,541, Cl. 43-57.50A.

Henrick, Clive A.; and Labovitz, Jeffery N., to Zoecon Corporation. Cycloalkenones. 4,006,188, Cl. 260-586.00R.

Henry, Dana R. Tennis rackets. 4,005,863, Cl. 273-73.00D.

Hepworth, Edward C.; Means, Rodney J.; and Peddle, Charles I., to Motorola, Inc. Logic circuitry for selection of dedicated registers. 4,006,457, Cl. 340-147.00R.

Herbert, Peter John: *See—*
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Herdzina, Frank John, Jr., to American Can Company. Apparatus for applying plastic to a planar surface. 4,005,960, Cl. 425-113.000.

Hermann Lanz AG, Switzerland: *See—*
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Herzl, Peter J., to Fischer & Porter Co. Non-contact sensor for vortex-type flowmeter. 4,005,604, Cl. 73-194.0VS.

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Hess, Mitchell J. Clamp shank device. 4,005,757, Cl. 172-710.000.

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Heuser, Peter: *See—*
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Hewitt, William D.; Diffrient, Roy S.; Bajackson, Richard A.; and Blair, Gerard M., to Westinghouse Electric Corporation. Computer controlled security system. 4,006,460, Cl. 340-149.00R.

Higginbotham, Alan Frank; and Jeffries, Kenneth Layton, to International Business Machines Corporation. Bias/erase oscillator. 4,006,433, Cl. 331-117.00R.

Higurashi, Minoru: *See—*
Sugisaki, Takao; Ochiai, Tatsushiro; Nishikawa, Kyoichi; and Higurashi, Minoru, 4,006,408.

Hills, Claude H., to United States of America, Agriculture. Process for removing off-flavor from maple sirup. 4,006,032, Cl. 127-46.00A.

Hiltebrandt, Siegfried, to Richard Wolf GmbH. Bipolar coagulation forceps. 4,005,714, Cl. 128-303.170.

Hinsche, Friedrich; and Schaupp, Kurt, to Bayer Aktiengesellschaft. Production of plaster floors by the flooding process. 4,005,954, Cl. 428-537.000.

Hiraga, Masaharu; and Shimizu, Shigemi, to Sankyo Electric Co., Ltd. Lubrication system for compressor unit. 4,005,948, Cl. 417-269.000.

Hirai, Akiyoshi; and Uemura, Hiroshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Master cylinders for hydraulic automotive brake systems. 4,005,796, Cl. 220-85.00R.

Hiratsuka, Nobuo; and Yaginuma, Nakatsugu, to Fuji Photo Film Co., Ltd. Support for electrophoretic analysis. 4,006,069, Cl. 204-180.00G.

Hironaka, Shunichi: *See—*
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Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, to Honda Giken Kogyo Kabushiki Kaisha. Automatic choke valve apparatus in an internal combustion engine. 4,005,690, Cl. 123-119.00F.

Hirose, Mitsuo; Oono, Takashi; and Ueno, Makoto, to Citizen Watch Co., Ltd. Printer. 4,005,770, Cl. 197-1.00R.

Hirschberg, Eugene H.: *See—*
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Ho, Andrew K. S.; and Kissin, Benjamin. Alcohol aversion process by enzyme inhibition. 4,006,240, Cl. 424-263.000.

Ho, Shiaw-Lei. Horizon indicating device for marine sextant. 4,005,938, Cl. 356-149.000.

Hodgman, John S.: *See—*
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Hofer, Alan: *See—*
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Hoffman, Doyt K.; Bach, Ricardo O.; and Kamienski, Conrad W., to Lithium Corporation of America. Stable hydrocarbon solutions of aluminum hydride. 4,006,095, Cl. 252-188.000.

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Hoffmann, Robert T.: *See—*
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Hoge, A. Russell; and Myers, Robert A., to Monsanto Company. Refrigerator construction. 4,005,919, Cl. 312-214.000.

Hoglund, Carl: *See—*
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Hoglund, Nils O.; and Hoglund, Carl, to Tri-Ordinate Corporation. Apparatus for improved control of a grinding machine. 4,005,552, Cl. 51-101.00R.

Hohmann, Walter, to Kruger & Co. KG. System for a crane boom. 4,006,347, Cl. 235-150.200.

Holda, Eugene M.: *See—*
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Holland, John H., to Arkansas Rock and Gravel Co. Paving material conveyor system. 4,005,790, Cl. 214-83.360.

Holmes, Julian C.: *See—*
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Holmes, Richard E.; and Jourdan, Glen P., to Eli Lilly and Company. Thio-substituted 2-oxo-indolines. 4,006,161, Cl. 260-325.00R.

Holtrop, John W., to United States of America, Navy. Liquid propellant gun. 4,005,632, Cl. 89-7.000.

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Honeywell Information Systems, Inc.: *See—*
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Honjo, Satoru: *See—*
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Hoog, Sivert, to Aktiebolaget Elof Malmberg. Apparatus for measuring the release force of safety ski bindings. 4,005,600, Cl. 73-133.00A.

Hooker Chemicals & Plastics Corporation: *See—*
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Horizons Incorporated a division of Horizons Research Incorporated: *See—*
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Hosmer/Dorrance Corporation: *See—*
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Houk, Richard D.: *See—*
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Howard, Dean D.: *See—*
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Howell, Mark Ian, to Electrolocation Limited. Apparatus for and methods of seismic prospecting. 4,006,445, Cl. 340-15.5TC.

Hrabak, Frantisek; and Bochal, Karel, to Ceskoslovenska akademie ved. Tetrachloroethoxyethyl esters and method for their preparation. 4,006,147, Cl. 260-486.00H.

Hudak, Joseph M., to United States of America, Air Force. Low power solid state three-phase overcurrent/undercurrent protection circuit. 4,006,387, Cl. 317-27.00R.

Hughes Aircraft Company: *See—*
Bartholomew, Wesley E., 4,006,388.
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Hull, Edward M.: *See—*
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Hults, Harold W., to Cutler-Hammer, Inc. Higher rated double-pole trigger switch. 4,006,333, Cl. 200-157.000.

Humphries, Thomas Milton, to Arrow Development Co., Inc. Vehicle passenger restraint mechanism. 4,005,877, Cl. 280-748.000.

Hunts, Ronald M.: *See—*
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Hurst, Gerald Covington; and Adams, Kenneth, to George M. Whiley Limited. Method of manufacturing cards and other documents. 4,006,050, Cl. 156-234.000.

Hutson, Thomas, Jr., to Phillips Petroleum Company. Catalytic reactor. 4,005,985, Cl. 23-288.00R.

Hydroacoustics Inc.: *See—*
Bouyoucos, John V.; Selsam, Roger L.; and Courtright, Dennis R., 4,005,637.

Hydrophilics International, Inc.: *See—*
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HydroTech International, Inc.: *See—*
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I E R Impression Enregistrement des Resultats S.A.: *See—*
Schulman, Charles; and Petit, Roger M., 4,005,792.

Ibata, Jyoji; Kobayashi, Hidehiko; Toyomoto, Kazuo; Suzuoki, Kazuhiro; Hayashi, Yoshio; and Kurihara, Masakazu, to Asahi Kasei Kogyo Kabushiki Kaisha. Photosensitive compositions comprising a polyester-polyether block polymer. 4,006,024, Cl. 96-115.00R.

Ichikawa, Kazuo, to Olympus Optical Co., Ltd. A.C. voltage regulator including bilateral thyristor. 4,006,368, Cl. 307-252.00B.

ICOS Corporation of America: *See—*
Tamaro, George John, 4,005,582.

Iiyama, Masahiko: *See—*
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, 4,005,690.

Ikezawa, Harumi: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,006,167.

Ilford Limited: *See—*
Neale, Denis Manktelow; and Throssell, Michael Gordon, 4,005,926.

Ilvespaa, Atso, to Ciba-Geigy Corporation. 1- or 2-[2-Hydroxy-3-amino-propoxy]-9,10-dihydro-9,10-ethano-anthracenes and their salts. 4,006,184, Cl. 260-570.700.

IMC Chemical Group, Inc.: *See—*
Wehrmeister, Herbert Louis, 4,006,148.

Immink, Kornelis Antonie: *See—*
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Whetstone, John, 4,006,134.

Imsand, Donald J. Three dimensional television system. 4,006,291, Cl. 358-92.000.

Inamdar, Udaykumar B.: *See—*
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Industrial Research Products, Inc.: *See—*
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Information Storage Systems, Inc.: *See—*
Cuda, John; and Sordello, Frank J., 4,006,394.

Ingram, Harold M., to Bro-Dart Inc. Card file drawer for apertured index cards. 4,005,797, Cl. 220-22.500.

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Inoue, Kiyoshi, 4,005,956.

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Bargeton, Daniel Ernest Louis; Vaida, P.; and Vardon, G., 4,005,702.

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International Business Machines Corporation: *See—*
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Cross, Jon L.; Homan, Merle Edward; Machol, Guenther Keith; Malm, Richard La Verne; and Svelund, Larry Eugene, 4,006,465.
Cuomo, Jerome John; Woodall, Jerry MacPherson; and Ziegler, James Francis, 4,005,698.
Eichelberger, Edward Baxter; and Robbins, Gordon Jay, 4,006,492.
Higginbotham, Alan Frank; and Jeffries, Kenneth Layton, 4,006,433.
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International Nickel Company, Inc., The: *See—*
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International Telephone and Telegraph Corporation: *See—*
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Wimmer, Jack D., 4,005,920.

Interstate Folding Box Company, The: *See—*
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Irons, Denis E., to Murphy Pacific Marine Salvage Co. Process for emergency small spill control. 4,006,082, Cl. 210-83.000.

Isa, Hiroshi; Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Yamashita, Tatsuji, to Lion Fat & Oil Co., Ltd. Method for preparation of liquid polyolefin oil. 4,006,199, Cl. 260-683.15B.

Ishihara, Kazuo: *See—*
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Ishimaru, Touru: *See—*
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Isley, Ralph E., to Standard Oil Company. Method for improving impact strength in high nitrile polymers by stretching and heat setting. 4,006,211, Cl. 264-291.000.

Isono, Tatsuji, to Matsushita Electric Industrial Co., Ltd. Door latch mechanism controlling switch in microwave oven or the like. 4,006,121, Cl. 200-61.640.

Itakura, Shoji, to Aisin Seiki Kabushiki Kaisha. Door locking mechanism. 4,005,887, Cl. 292-216.000.

Itek Corporation: *See—*
French, Hollis E.; and Kruse, Juergen M., 4,006,271.

Itoh, Hidekuni, to Showa Manufacturing Co., Ltd. Sealing arrangement for a shock absorber having an annular reservoir. 4,005,769, Cl. 188-315.000.

Itoi, Kazuo: *See—*
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Iwasaki, Koji: *See—*
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Izura, Yoshiteru; Tanaka, Masaaki; and Sasaki, Seishi, to Matsushita Electric Industrial Co., Ltd. Code read-out means. 4,006,343, Cl. 235-61.11E.

J. I. Case Company: *See—*
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Dunn, Donnell L., 4,005,636.
Tucek, Frank J., 4,005,894.

J. Wizemann & Co.: *See—*
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Jackson, Thomas E., to Sandoz, Inc. Substituted α-methylsulfinyl-o-toluidines. 4,006,183, Cl. 260-558.00S.

Jacobs, Morton C.: *See—*
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Jacobsen, Theodore H.; and Russo, Anthony J., to F.P.M. Corporation. Portable cutting and sewing work station. 4,005,873, Cl. 280-63.000.

Jager, Gerhard; Wenzelburger, Jurgen; Eue, Ludwig; and Schmidt, Robert Rudolf, to Bayer Aktiengesellschaft. 1-Alkylideneaminouracil compounds and herbicidal compositions. 4,006,008, Cl. 71-88.000.

Jager, Horst; and Klauke, Erich, to Bayer Aktiengesellschaft. Process for the preparation of 1-aminoanthraquinone. 4,006,170, Cl. 260-378.000.

Janssen, Alexander Patton. Cooking utensil accessories. 4,005,645, Cl. 99-403.000.

Jeffries, Kenneth Layton: *See—*
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Jeffries, Warren E. Chainless bicycle drive mechanism. 4,005,611, Cl. 74-416.000.

Jenni, Albert. Seat with an adjustable back. 4,005,903, Cl. 297-328.000.

Jennings Compound Bow, Inc.: *See—*
Jennings, Thomas Paul, 4,005,696.

Jennings, Thomas Paul, to Jennings Compound Bow, Inc. Compound bow. 4,005,696, Cl. 124-24.00R.

Jerrold Electronics Corporation: *See—*
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Johannsen, James Robert: *See—*
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John Fluke Mfg. Co., Inc.: *See—*
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Johns, Douglas A.: *See—*
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Johnson, Berthuld Thomas. Weigh scales. 4,005,758, Cl. 177-229.000.
Johnson Controls, Inc.: *See—*
Matthews, Russell B., 4,005,585.
Johnson, Jack L.; and Pierotti, Reno U., to Aeronutronic Ford Corporation. Radiant energy tracking device. 4,006,356, Cl. 250-203.00R.
Johnson, John H.: *See—*
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Johnson & Johnson: *See—*
Mesek, Frederick K., 4,005,713.
Sipos, Tibor, 4,006,218.
Johnston, Mack S. Single-opening beer keg and method of producing from conventional keg. 4,005,813, Cl. 228-184.000.
Jokl, Jan, to Ceskoslovenska akademie ved. Method for performing a separating analysis. 4,006,350, Cl. 235-151.350.
Jonathan, Johan. Concealed regenerative combustion engine. 4,005,687, Cl. 123-53.00A.
Jones, J. Paul, to Procter & Gamble Company, The. Laundering aid. 4,006,092, Cl. 252-95.000.
Jones, James J., to Texas Instruments Incorporated. DC level detector and zero velocity gate circuit for use in a vehicle skid control braking system. 4,005,909, Cl. 303-91.000.
Jones, William Edward: *See—*
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Jorgensen, Howard E.; Kirchoff, George F.; and Schneiter, Fred E., to Thiokol Corporation. Gas generator for automobile safety cushions. 4,005,876, Cl. 280-741.000.
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Judat, Helmut: *See—*
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Junkison, Anthony Richard: *See—*
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Jury, Egon, to Metallgesellschaft Aktiengesellschaft. Process for drying moist materials, particularly crystalline solids containing water of hydration. 4,005,987, Cl. 23-313.0FB.
Kabbe, Hans-Joachim: *See—*
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Kabushiki Kaisha Meidensha: *See—*
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Kachik, Robert H.; Manganello, Samuel J.; and Pignocco, Arthur J., to United States Steel Corporation. Method of restoring ingot mold stools and closed-bottom ingot mold. 4,005,742, Cl. 164-54.000.
Kaderka, Freddie S.: *See—*
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Kadoiri, Etsuro: *See—*
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Kahan, Jean S.; Kahan, Frederick M.; Stapley, Edward O.; Goegelman, Robert T.; and Hernandez, Sebastian, to Merck & Co., Inc. Thienamycin production. 4,006,060, Cl. 195-80.00R.
Kaiser, Hans; Kopf, Arthur; and Muller, Josef, to Gebruder Junghans GmbH. Device for setting mechanical time fuses. 4,005,631, Cl. 89-6.500.
Kakiuchi, Akio: *See—*
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Kamienski, Conrad W.; Morrison, Robert C.; and Martin, Kenneth R., to Lithium Corporation of America. Preparation of aryllithium compounds by metalation. 4,006,187, Cl. 260-577.000.
Kamienski, Conrad W.: *See—*
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Kanda, Kimio; and Ohtaka, Tadashi, to Hitachi, Ltd. Apparatus for displaying image of specimen. 4,006,357, Cl. 250-310.000.
Kandel, Thomas G. Electrophotographic toner removal brush and method of making same. 4,005,512, Cl. 29-120.000.
Kanematsu-Gosho (U.S.A.), Inc.: *See—*
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Karami, Hamzeh, to Colgate-Palmolive Company. Disposable diaper with adjustable tape fastener. 4,005,712, Cl. 128-284.000.
Karayannis, Panayotis, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Safety device for a current generator used with an electrical projectile fuze. 4,005,658, Cl. 102-70.20G.
Karl Handle & Sohne, Maschinenfabrik und Eisengiesserei: *See—*
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Karrip, Alexander A.: *See—*
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Katoh, Hiroshi: *See—*
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Kaufman, Alan D.; Reistad, Arne M., Jr.; and Wilke, David J., to Pennsylvania Wire Rope Corporation. Brake operating lever. 4,005,613, Cl. 74-489.000.
Kautz, Glenn E., to H. H. Robertson Company. Apparatus for producing shaped glass fiber reinforced gypsum articles. 4,005,959, Cl. 425-112.000.
Kawagoe, Takahiro: *See—*
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Kawamura, Yoshio, to Agency of Industrial Science & Technology. Gas circulating combustion means. 4,005,977, Cl. 431-116.000.
Kawasaki Steel Corporation: *See—*
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Kennel, Richard. Wear indicator for brake lining. 4,005,766, Cl. 188-1.00A.
Kenney, Edward J.; Smith, Frank R., Jr.; and DiSalvo, Walter A., to Colgate-Palmolive Company. Manufacture of free-flowing particu-

late heavy duty synthetic detergent composition. 4,006,110, Cl. 252-540.000.

Kent, Brian Elwood, to Deere & Company. Chemical concentrate injection system. 4,005,803, Cl. 222-57.000.

Keppel, Frank J.: *See—*
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Kerbel, Sheldon J., to Hazeltine Corporation. Method for fabricating a temperature compensated surface wave device. 4,006,435, Cl. 333-30.00R.

Kerfoot, Derek G. E., to Canada Wire and Cable Limited. Photodeposition of metals on a non-conductive substrate. 4,006,269, Cl. 427-54.000.

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Kidder, David Conrad. Three-dimensional amusement device. 4,005,865, Cl. 273-109.000.

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Kieferle, Wolfgang, to Hawera Probst Kommanditgesellschaft Hartmetall-Werkzeugfabrik Ravensburgh. Method of and apparatus for hardening workpieces of steel. 4,006,042, Cl. 148-16.500.

Kieffer, John B.; Vogel, Gregory G.; and Larsen, Raymond B., to Harris Corporation. Automatic justifying typewriter having pitch changing and line spacing apparatus. 4,005,772, Cl. 197-84.00R.

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Kimberlin, Dan R.; and Milton, Thomas J., to General Motors Corporation. Steering column mounted multiple switch assembly. 4,006,328, Cl. 200-61.540.

Kimmel, Hans, to Gunther Papenmeier KG, Maschinen-und Apparatebau. Mixing process and an arrangement for carrying out the process. 4,005,853, Cl. 259-3.000.

Kindler, Horst: *See—*
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Kindlimann, Lynn E., to Allegheny Ludlum Industries, Inc. Austenitic alloy. 4,006,012, Cl. 75-122.000.

King, Derek Anthony: *See—*
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King, James A.: *See—*
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King, Robert David; and Hiscutt, Robert, to Triplex Safety Glass Company Limited. Metal oxide films. 4,006,070, Cl. 204-192.000.

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Kiovsky, Thomas E.; and Wald, Milton M., to Shell Oil Company. Methanation catalyst recovery. 4,006,177, Cl. 260-449.00M.

Kirchoff, George F.: *See—*
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Kirkpatrick, Robert G., to General Electric Company. Structure for article handling systems. 4,005,633, Cl. 89-33.00D.

Kiss, Franz: *See—*
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Kitaura, Mashio: *See—*
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Kjaer, Ian, to A/S A. M. Hirschsprung & Sonner. Method of spreading out tobacco leaves and a device for spreading out tobacco leaves by means of this method. 4,005,719, Cl. 131-148.000.

Klatt, Alfred; Lindemann, Klaus; Luhdorff, Dieter; and Reinecke, Erich, to WABCO Westinghouse GmbH. Individual wheel antiskid brake control system arranged to prevent excessive brake pressure differences. 4,005,911, Cl. 303-111.000.

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Klein, Heinz Gunter: *See—*
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Klein, Miriam Travis. Individualized bed covering. 4,005,499, Cl. 5-334.00R.

Kleinschmidt, Nick; and Netzer, James V., to United States of America, Navy. Inflatable stabilizer/retarder. 4,005,655, Cl. 102-4.000.

Klemm, Julius Roland. Mast displacement mechanism. 4,005,669, Cl. 114-91.000.

Klestov, Igor Alexeevich: *See—*
Juganson, Elmar Juganovich; Chernyavsky, Isaak Yakovlevich; Ivantsov, Vladimir Yakovlevich; Blinov, Jury Ivanovich; Ustyantsev, Vladimir Petrovich; and Klestov, Igor Alexeevich, 4,005,741.

Klug, Sigmund L.; Patrizio, Frederick J.; and Einstman, William J., to General Foods Corporation. Iron-fortified soluble coffee and method for preparing same. 4,006,263, Cl. 426-594.000.

Kmetz, Allan Robert; and Creagh, Linda Truitt, to Texas Instruments Incorporated. Nematic liquid crystal displays for low voltage direct current operation. 4,005,928, Cl. 350-160.0LC.

Knodler, Diethelm; Kropfl, Hans; and Steinke, Alexander, to Siemens Aktiengesellschaft. Resilient tension device in nuclear reactors. 4,006,055, Cl. 176-61.000.

Knuckles, Benny E.: *See—*
Bickoff, Emanuel M.; de Fremery, Donald; Edwards, Richard H.; Knuckles, Benny E.; Kohler, George O.; and Miller, Raymond E., 4,006,078.

Knudsen, Niels Hjarno, to N. Hjarno Knudsen A/S. Casting machine for making concrete slabs. 4,005,971, Cl. 425-410.000.

Kny, Hermann: *See—*
Bohner, Beat; Dawes, Dag; Kny, Hermann; Meyer, Willy; and Perchais, Jean, 4,006,157.

Kobayashi, Eiichi: *See—*
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Kobayashi, Hidehiko: *See—*
Ibata, Jyoji; Kobayashi, Hidehiko; Toyomoto, Kazuo; Suzuoki, Kazuhiro; Hayashi, Yoshio; and Kurihara, Masakazu, 4,006,024.

Kobee, Frank R. Extruder for plastic materials. 4,005,962, Cl. 425-197.000.

Koch, Keith E.: *See—*
Ball, Glen A.; Koch, Keith E.; Lamport, Ivan R.; and Untz, Robert W., 4,005,896.

Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; and Payakov, Stefan Georgiev, to Znitmash of Chaussee za Gara Izkar. Machine for magnetically polish-grinding work pieces having large dimensions. 4,005,550, Cl. 51-56.00R.

Koehring Company: *See—*
Bishop, Thomas G., 4,005,964.

Koermer, Gerald S., to Celanese Corporation. Production of hydroxyl compounds. 4,006,190, Cl. 260-602.000.

Koga, Toshio, to Nippon Electric Company, Ltd. Television signal coding system. 4,006,297, Cl. 358-136.000.

Kohler, George O.: *See—*
Bickoff, Emanuel M.; de Fremery, Donald; Edwards, Richard H.; Knuckles, Benny E.; Kohler, George O.; and Miller, Raymond E., 4,006,078.

Kohn, Karen: *See—*
Kohn, Robert A.; and Kohn, Karen, 4,005,662.

Kohn, Robert A.; and Kohn, Karen. Armor window. 4,005,662, Cl. 109-16.000.

Kohshoh Limited: *See—*
Noda, Taizo, 4,005,510.

Koide, Hideo: *See—*
Miyamoto, Kazuo; Koide, Hideo; and Suzuki, Isao, 4,005,570.

Kolk, Clarence H. Vacuum treating fruit pieces in aqueous solutions consisting of sodium bisulfite or sodium sulfite and citric acid. 4,006,257, Cl. 426-269.000.

Kolliker, Hans Peter, to Ciba-Geigy Corporation. Anthraquinone dyestuffs. 4,006,163, Cl. 260-326.00C.

Kolmagorov, Vadim Leonidovich: *See—*
Uralsky, Viktor Ivanovich; and Kolmagorov, Vadim Leonidovich, 4,005,596.

Konczak, Hank A.: *See—*
Charette, Raymond O.; and Konczak, Hank A., 4,006,480.

Koninklijke Emballage Industrie Van Leer B.V.: *See—*
Mannaerts, Livinus E. M. J., 4,005,799.

Kopf, Arthur: *See—*
Kaiser, Hans; Kopf, Arthur; and Muller, Josef, 4,005,631.

Korenbljum, Isai Volfovich: *See—*
Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; Kuznetsov, Viktor Georgievich; Kagan, Naum Yakovlevich; Razumeev, Jury Alexeevich; Bortnik, Vladimir Mironovich; Korenbljum, Isai Volfovich; and Dmitrieva, Valentina Alexeevna, 4,006,027.

Korte, Richard M.; and Zlupko, John E., to General Electric Company. Circuit breaker arc chute having components of refractory inorganic material with surfaces of an amorphous fused material, a major proportion of which is silica, and method for making same. 4,006,330, Cl. 200-144.00C.

Kosmatka, Walter J., to General Electric Company. Filter attachment for parabolic reflector lamps. 4,006,377, Cl. 313-112.000.

Kouchich, Allan V.; and Marshall, Robert, to Allen-Bradley Company. Composition resistor with an integral thermal fuse. 4,006,443, Cl. 338-215.000.

Kovacs, Endre; Kovacs, Peter; Kovacs, Michael; Kovacs, Marta; and Kovacs, Geza. Fuel injection apparatus. 4,005,685, Cl. 123-33.00G.

Kovacs, Geza: *See—*
Kovacs, Endre; Kovacs, Peter; Kovacs, Michael; Kovacs, Marta; and Kovacs, Geza, 4,005,685.

Kovacs, Marta: *See—*
Kovacs, Endre; Kovacs, Peter; Kovacs, Michael; Kovacs, Marta; and Kovacs, Geza, 4,005,685.

Kovacs, Michael: *See—*
Kovacs, Endre; Kovacs, Peter; Kovacs, Michael; Kovacs, Marta; and Kovacs, Geza, 4,005,685.

Kovacs, Peter: *See—*
Kovacs, Endre; Kovacs, Peter; Kovacs, Michael; Kovacs, Marta; and Kovacs, Geza, 4,005,685.

Kozuki, Susumu: *See—*
Aizawa, Hiroshi; Iwashita, Tomonori; Fukushima, Tadahide; Iura, Yukio; Uchidoi, Masanori; and Kozuki, Susumu, 4,006,489.

Kragness, David W.: *See—*
Bateman, Allen H.; Case, Charles B.; Kragness, David W.; and LeDuc, Edward C., 4,005,626.

Kramer, Carl; and Haage, Karl, to Dynamit Nobel Aktiengesellschaft. Suction reduction installation for roofs. 4,005,557, Cl. 52-173.00R.

Krause, Ernst H.; and Cleeton, Claud E. Pulse signaling system. 4,005,818, Cl. 325-38.00R.

Krebs, Leon: *See—*
Lanni, Michael J.; Calamera, John; Krebs, Leon; and O'Connor, Bernard J., 4,005,608.

Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-6-acyloxytetrahydropyrimidinone herbicides. 4,006,009, Cl. 71-90.000.

Kresge, Wilbur R.: *See—*
Anderson, Gerald L.; and Kresge, Wilbur R., 4,005,880.

Kropfl, Hans: *See—*
Knodler, Diethelm; Kropfl, Hans; and Steinke, Alexander, 4,006,055.

Kropp, Frederic T.: *See—*
Vuille, Claude H.; and Kropp, Frederic T., 4,005,778.

Krueger, Robert A.: *See—*
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Kruger & Co. KG: *See—*
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Kruger, Gerd: *See—*
Keck, Johannes; Noll, Klaus-Reinhold; Pieper, Helmut; Kruger, Gerd; and Puschmann, Sigfrid, 4,006,246.

Kruger, Wolfgang: *See—*
Wegner, Hans-George; Kruger, Wolfgang; Sochtig, Gunter; and Brandes, Gunter, 4,006,077.

Kruper, Burkhard, to Gebr. Cramer, Firma. Rotatable grill. 4,005,646, Cl. 99-427.000.

Kruse, Juergen M.: *See—*
French, Hollis E.; and Kruse, Juergen M., 4,006,271.

Kubik, Philip A. Hydraulic directional memory unit. 4,005,734, Cl. 137-625.630.

Kuboshima, Makoto, to Fuji Photo Film Co., Ltd. Bellows for use in a foldable camera. 4,006,488, Cl. 354-187.000.

Kudo, Hirokatu: *See—*
Okamoto, Kintaro; Kudo, Hirokatu; Kadoiri, Etsuro; and Soma, Hiroshi, 4,005,761.

Kuhla, Donald E., to Pfizer Inc. Preparation of methyl-3-(2-quinoxalinylmethylene)carbazate-N^1,N^4-dioxide. 4,006,142, Cl. 260-250.0QN.

Kuhle, Engelbert: *See—*
Siegle, Peter; Kuhle, Engelbert; Zumach, Gerhard; Hammann, Ingeborg; and Homeyer, Bernhard, 4,006,244.

Kumon, Hiroshi: *See—*
Uebayasi, Yositaka; Kumon, Hiroshi; Yamada, Michinobu; and Oe, Yoshikazu, 4,005,991.

Kuniyoshi, Yasunobu; and Yamagiwa, Kazuo, to Sony Corporation. Phase detector. 4,006,423, Cl. 329-103.000.

Kuno, Hiromu J.: *See—*
Chang, Yu-Wen Y.; Kuno, Hiromu J.; and Chao, Pei Y., 4,006,425.

Kuntzsch, Donald W.: *See—*
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Kuraray Co., Ltd.: *See—*
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kuroda, Nobuyuki: *See—*
Matsuura, Kazuo; Kuroda, Nobuyuki; Shiraishi, Takeichi; and Miyoshi, Mitsuji, 4,006,101.

Kurz, Jessie M., executrix: *See—*
Kurz, Philip, deceased; and Kurz, Jessie M., executrix, 4,006,267.

Kurz, Philip, deceased; and by Kurz, Jessie M., executrix, to Xerox Corporation. Color highlighting process. 4,006,267, Cl. 427-14.000.

Kurzweil, Karel Gaston: *See—*
Sigel, Pierre Louis; and Kurzweil, Karel Gaston, 4,005,651.

Kuznetsov, Viktor Georgievich: *See—*
Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; Kuznetsov, Viktor Georgievich; Kagan, Naum Yakovlevich; Razumeev, Jury Alexeevich; Bortnik, Vladimir Mironovich; Korenbljum, Isai Volfovich; and Dmitrieva, Valentina Alexeevna, 4,006,027.

Kyburz, Emilio: *See—*
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Gerecke, Max; Kaplan, Jean-Pierre; and Kyburz, Emilio, 4,006,145

Kyros, George C., to Beatrice Foods Co. Olive stuffed with reconstituted pimento and method of production. 4,006,256, Cl. 426-102.000.

La Nationale S.A.: *See—*
Guenin, Andre, 4,005,930.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder paint blend comprising epoxy-functional copolymer and carboxy and amide-functional copolymer. 4,006,200, Cl. 260-836.000.

Laborde, Joseph N., to Ethyl Corporation. Structural connection. 4,005,941, Cl. 403-247.000.

Labovitz, Jeffery N.: *See—*
Henrick, Clive A.; and Labovitz, Jeffery N., 4,006,188.

LaCombe, Donald J., to United States of America, Air Force. Method for dispersing metallic particles in a dielectric binder. 4,006,479, Cl. 343-18.00A.

Lacour, Bernard, to Compagnie Industrielle des Lasers. Device for treating a laser light pulse. 4,006,426, Cl. 330-4.300.

Laerdal, Asmund Sigurd. Compression bandage. 4,005,709, Cl. 128-155.000.

Laird, William F., to Hartford Fibres Ltd. Random length cutter. 4,006,277, Cl. 428-224.000.

Laitram Corporation, The: *See—*
Lapeyre, Fernand S., 4,005,504.

Lam, Bing L.: *See—*
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Lamport, Ivan R.: *See—*
Ball, Glen A.; Koch, Keith E.; Lamport, Ivan R.; and Untz, Robert W., 4,005,896.

Landell, William F., to FX Systems, Inc. Industrial process controller. 4,006,464, Cl. 340-172.500.

Landreau, Jean Florent Francois Marcel Robert, to Societe Anonyme Francaise du Ferodo. Winding cables and the like on to storage drums. 4,005,834, Cl. 242-158.300.

Lane, William B., to Deccofelt Corporation. Twist-off, break-away opening cover. 4,005,842, Cl. 248-200.000.

Langdon, Robert P.: *See—*
Frair, William J.; and Langdon, Robert P., 4,005,827.

Langlois, Roland E.; and Morrison, Charles R., to Owens-Corning Fiberglas Corporation. Oil absorbent material and method of oil removal. 4,006,079, Cl. 210-36.000.

Lanni, Michael J.; Calamera, John; Krebs, Leon; and O'Connor, Bernard J., to Bendix Corporation, The. Electrically controlled rate integrating device. 4,005,608, Cl. 73-504.000.

Lapeyre, Fernand S., to Laitram Corporation, The. Method for partially peeling shrimp. 4,005,504, Cl. 17-48.000.

Larsen, Raymond B.: *See—*
Kieffer, John B.; Vogel, Gregory G.; and Larsen, Raymond B., 4,005,772.

Larsson, Erik Georg, to Kabeldon AB. High-voltage cable joint with conductive means to decrease electric field intensity therein. 4,006,286, Cl. 174-73.00R.

Lawrence Peska Associates, Inc.: *See—*
Carrero, Alfred V., 4,005,673.
Maldonado, Francisco, 4,005,869.
O'Toole, Joseph J., 4,005,678.
Tait, William, 4,005,859.

Lay, Dierk: *See—*
Linden, Gerhard; Lay, Dierk; and Tiedtke, Karl, 4,005,754.

Leasher, Arthur L.; and Sanborn, Lawrence F., to Dow Chemical Company, The. Electrical distribution panel lockout means for switch actuators. 4,006,324, Cl. 200-42.00T.

Lederer, Edgar: *See—*
Pickenhagen, Wilhelm; Dietrich, Paul; Keil, Borivoj; and Lederer, Edgar, 4,006,261.

LeDuc, Edward C.: *See—*
Bateman, Allen H.; Case, Charles B.; Kragness, David W.; and LeDuc, Edward C., 4,005,626.

Lee, Thomas Brian: *See—*
Augstein, Joachim; Carter, David; and Lee, Thomas Brian, 4,006,245.

Leehan, Gerald W.; Miniter, Sylvester F., III; and Sassa, Augustus J., to International Business Machines Corporation. Data storage cell with transistors operating at different threshold voltages. 4,006,469, Cl. 340-173.00R.

Leiber, Heinz; and Weber, Werner, to Teldix GmbH. Antilocking control system. 4,005,910, Cl. 303-96.000.

Lejeune, Daniel, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Abrasion switch device for detecting low tire pressure. 4,006,326, Cl. 200-61.240.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Quate, Calvin F.; and Cunningham, James A., 4,006,444.

Leloux, Arnoldus Willem Jan, to Wavin B.V. Apparatus for continuously producing seals in tube-shaped plastics film material. 4,005,970, Cl. 425-392.000.

Lenz, Arnold: *See—*
Termin, Erich; Lenz, Arnold; and Bleh, Otto, 4,006,175.

Lerner, Sidney I., to Ethyl Corporation. Methods and compositions for reducing plasma lipid levels. 4,006,252, Cl. 424-331.000.

Lescarden Ltd.: *See—*
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Leuck, Steven M.: *See—*
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Lever Brothers Company: *See—*
Malhotra, Virender Nath; and Mather, John, 4,006,111.

Levine, Alfred B. Pocket sized non-lethal electrical weapon. 4,006,390, Cl. 317-262.00S.

Levine, Harry: *See—*
McLaughlin, William L.; Levine, Harry; and Rosenstein, Marvin, 4,006,023.

Lewis, Bernard L.; and Howard, Dean D. Security device. 4,006,478, Cl. 343-18.00E.

Lewis, Billy W.: *See—*
Myers, Walter I.; Goodbary, Edgar R.; Thomas, Richard L.; Lewis, Billy W.; and Bartley, Francis A., 4,005,850.

Lewis, Kenneth Dan: *See—*
Charlton, Andrew Paul; Lewis, Kenneth Dan; Willus, Charles Arthur; and Nyrop, Per, 4,005,817.

Li, Chien C., to Allied Chemical Corporation. Composition, method and apparatus for absorption heating. 4,005,584, Cl. 62-112.000.

Libbey-Owens-Ford Company: *See—*
Hetman, Thomas, Jr., 4,006,002.

Lieberam, Armin: *See—*
Majer, Norbert; Bien, Hans-Samuel; Judat, Helmut; and Lieberam, Armin, 4,006,171.

Liman, Helmut, to Blaupunkt-Werke GmbH. Pulse interference blanking circuit for radio receivers. 4,006,419, Cl. 325-348.000.

Limburg, William W.: *See—*
Williams, David J.; Limburg, William W.; and Pearson, James M., 4,006,017.

Lindblom, Richard A.; and Madden, Richard E., to Amway Corporation. Plastic bottle storable oven cleaner. 4,006,091, Cl. 252-90.000.

Linde Aktiengesellschaft: *See—*
Schonpflug, Eugen, 4,006,001.

Lindemann, Klaus: *See—*
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Linden-Alimak AB: *See—*
Dubois, Michel, 4,005,905.

Linden, Gerhard; Lay, Dierk; and Tiedtke, Karl. Process for the automatic reporting and extinguishing of fires. 4,005,754, Cl. 169-46.000.

Lines, Roy C. Cam operated stone grinding device. 4,005,551, Cl. 51-101.00R.

Lion Fat & Oil Co., Ltd.: *See—*
Isa, Hiroshi; Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Yamashita, Tatsuji, 4,006,199.

Lippincott, Dorothy M., executrix: *See—*
Lippincott, Leander H., deceased, 4,005,612.

Lippincott, Leander H., deceased (by Lippincott, Dorothy M., executrix), to United Technologies Corporation. Preloaded anti-rattle device. 4,005,612, Cl. 74-470.000.

Lirette, Douglas E., to Door Controls Incorporated. Flush bolt mechanisms. 4,005,886, Cl. 292-177.000.

Liskov, Nathan A.; Bickford, William J.; and Tanzi, Paul J., to Raytheon Company. Quaternary phase-shift keying with time delayed channel. 4,006,418, Cl. 325-163.000.

Lithium Corporation of America: *See—*
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Kamienski, Conrad W.; Morrison, Robert C.; and Martin, Kenneth R., 4,006,187.

Livermore and Knight Co., Inc.: *See—*
Arkell, William C., 4,005,653.

Lloyd, Richard J., to Garrett Corporation, The. Turbocharger control and method. 4,005,579, Cl. 60-602.000.

Lochner, Kaspar. Damping member. 4,005,858, Cl. 267-136.000.

Locke, Helmut; and Salzer, Martin, to Rosenthal Technik AG. Ceramic cap bone prosthesis and method of implantation. 4,005,495, Cl. 3-1.910.

Lockett, George E., to General Atomic Company. Vapor generator. 4,005,681, Cl. 122-32.000.

Lole, Mark Roger. Equipment for milking parlours. 4,005,680, Cl. 119-14.080.

Lorthiois, Thierry Antoine, to Pont-A-Mousson S.A. Butterfly valve. 4,005,849, Cl. 251-305.000.

Lowe, Terry Lee; and Head, Glenn Dale, to Deere & Company. Stack wagon. 4,005,565, Cl. 56-344.000.

Luberoff, Benjamin J.; and Simmons, Todd S., to Lummus Company, The. Production of phenols. 4,006,194, Cl. 260-621.00C.

Lucas Industries Limited: *See—*
Farr, Glyn Phillip Reginald, 4,005,759.

Luckenbach, Edward C., to Exxon Research and Engineering Company. Method of regenerating a cracking catalyst with substantially complete combustion of carbon monoxide. 4,006,075, Cl. 208-164.000.

Ludwig, George C.: *See—*
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Ludwig Mfg. Company, Inc., The: *See—*
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Luhdorff, Dieter: *See—*
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Lukas, Helmut Hans: *See—*
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Lukkarila, Jeffrey Reed, to Magnavox Company, The. Video game rebound apparatus. 4,006,474, Cl. 340-324.0AD.

Lummus Company, The: *See—*
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Lundquist, Robert H. Adjustable paper guide for copying machines. 4,005,794, Cl. 271-161.000.

Luo, Fang-Chen; Brody, Thomas P.; and Davies, David H., to Westinghouse Electric Corporation. Electroluminescent display panel with enlarged active display areas. 4,006,383, Cl. 315-169.0TV.

Luppi, Carlos Enrique; Tavolini, Marino Antonio; and Travaini, Juan Carlos Roberto, to Deere & Company. Seat assembly including a turnaround-type seat. 4,005,845, Cl. 248-419.000.

Lutke, Helmut; and Schalude, Willi, to Ford Motor Company. Vehicle roof with a movable panel. 4,005,901, Cl. 296-137.00B.

Lyass, Abram Moiseevich; Borsuk, Pavel Afanasievich; Usubov, Zokhrab Gamid Ogly; Kuznetsov, Viktor Georgievich; Kagan, Naum Yakovlevich; Razumeev, Jury Alexeevich; Bortnik, Vladimir Mironovich; Korenbljum, Isai Volfovich; and Dmitrieva, Valentina Alexeevna. Process for producing foundry mounds and cores. 4,006,027, Cl. 106-38.50R.

Lyman, Frank, Jr.; and McDonald, William C., to Cambridge Thermionic Corporation. Stepping motor. 4,006,375, Cl. 310-49.00R.

Lyons, Arthur. Refrigerated butter dish. 4,005,586, Cl. 62-372.000.

MacDonald, Robert D.; and Rose, Robert K., to Champion Home Builders Co. Annular heat exchanger fins. 4,005,748, Cl. 165-151.000.

Machata, Charles. Spray nozzle. 4,005,720, Cl. 132-9.000.

Machol, Guenther Keith: *See—*
Cross, Jon L.; Homan, Merle Edward; Machol, Guenther Keith; Malm, Richard La Verne; and Svelund, Larry Eugene, 4,006,465.

MacKenzie, Burton Thornley, Jr.; Prober, Maurice; and Wilkus, Edward Vincent, to General Electric Company. Preparation of di-tertiary butyl peroxide crosslink polyolefin materials. 4,006,283, Cl. 526-57.000.

Madden, Richard E.: *See—*
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Magnaflux Corporation: *See—*
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Magnavox Company, The: *See—*
Lukkarila, Jeffrey Reed, 4,006,474.

Majer, Norbert; Bien, Hans-Samuel; Judat, Helmut; and Lieberam, Armin, to Bayer Aktiengesellschaft. Process for the preparation of halogenoanthraquinones. 4,006,171, Cl. 260-384.000.

Makedonski, Boris Georgiev: *See—*
Kochemidov, Atanas Dimitrov; Makedonski, Boris Georgiev; Dumanov, Ivan Minkov; and Payakov, Stefan Georgiev, 4,005,550.

Maki, Takeshi: *See—*
Akagawa, Masatake; and Maki, Takeshi, 4,006,411.

Makipirtti, Simo Antero Iivari; and Relander, John Henrik, to Outokumpu Oy. Process for fining carbonaceous alloys of iron, nickel and/or cobalt. 4,006,013, Cl. 75-130.500.

Maldonado, Francisco, to Lawrence Peska Associates, Inc., a part interest. Wire puzzle. 4,005,869, Cl. 273-158.000.

Malhotra, Virender Nath; and Mather, John, to Lever Brothers Company. Production of alkane: olefin sulfonate mixtures by sequential sulfonation and sulfitation. 4,006,111, Cl. 252-555.000.

Malik, Joseph M. Mailbox having dual access closures and signal means. 4,005,816, Cl. 232-35.000.

Malm, Richard La Verne: *See—*
Cross, Jon L.; Homan, Merle Edward; Machol, Guenther Keith; Malm, Richard La Verne; and Svelund, Larry Eugene, 4,006,465.

Manabe, Masami: *See—*
Kawai, Noriaki; Okamoto, Hisaji; Takeda, Yosiaki; Sano, Fukuzi; Kakiuchi, Akio; Manabe, Masami; Nomura, Takashi; and Abe, Sigeya, 4,005,688.

Manaugh, Carlisle F. Elevator mechanism for multiple level mechanical car parking structure. 4,005,785, Cl. 214-16.1EB.

Manceau, Marcel, to Creusot-Loire. Pivotally mounted injection molding apparatus. 4,005,961, Cl. 425-190.000.

Mandai, Hiroshi: *See—*
Isa, Hiroshi; Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Yamashita, Tatsuji, 4,006,199.

Manganello, Samuel J.: *See—*
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Manitowoc Company, Inc., The: *See—*
Morrow, James G., Sr.; and Pech, David J., 4,005,780.

Mannaerts, Livinus E. M. J., to Koninklijke Emballage Industrie Van Leer B.V. Container and closure with sealing threads. 4,005,799, Cl. 220-288.000.

Manufacturing Approaches & Total Concepts Inc.: *See—*
Strange, Delbert D.; and Hunts, Ronald M., 4,005,738.

Mao, George W., to Gould Inc. Maintenance-free battery and method for reducing the current draw of such batteries. 4,006,035, Cl. 429-72.000.

Marantz, Daniel Richard, to American Can Company. Double wrap package. 4,005,777, Cl. 206-497.000.

Marathon Oil Company: *See—*
Argabright, Perry A.; Presley, C. Travis; and Wenger, Charles B., 4,006,098.

Marcil, Jean Pierre. Magnetic game. 4,005,866, Cl. 273-131.00A.

Mardix, Inc.: *See—*
Baker, Richard H.; and Hix, Richard C., 4,006,459.

Mariani, Giuseppe, to Snia Viscosa Societa Nazionale Applicazioni Viscosa S.p.A. Device for securing the tail end of yarn bobbins. 4,005,567, Cl. 57-34.0TT.

Marion, Charles P.; and Crouch, William B., to Texaco Inc. Manufacture of gaseous mixtures comprising hydrogen and carbon monoxide. 4,006,099, Cl. 252-373.000.

Marion, Robert: *See—*
Dach, Hansjorg; and Marion, Robert, 4,005,620.

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State for Industry in Her Britannic Majesty's Government of The. Electric cells. 4,006,281, Cl. 429-103.000.
Markl, Georg, to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH. Fault locating system and method for transmission lines and repeater stations. 4,006,320, Cl. 179-175.31R.
Marquardt-Hudes, Inc.: *See*—
Marquardt, Max, 4,005,588.
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Marsh, Gerald A.: *See*—
Burton, James A.; and Marsh, Gerald A., 4,005,881.
Marshall, Robert: *See*—
Kouchich, Allan V.; and Marshall, Robert, 4,006,443.
Marson Fastener Corporation: *See*—
Di Maio, Anthony E.; and Todisco, Joseph G., 4,005,519.
Martchenke, Earl J. Accumulator program for electroplating energy. 4,006,071, Cl. 204-228.000.
Martin, Brice Eugene: *See*—
Alper, Allen Myron; Boyer, Carl William; and Martin, Brice Eugene, 4,006,212.
Martin Brinkmann AG: *See*—
Messner, Rudolf; and Weisser, Walter, 4,005,716.
Martin, Kenneth R.: *See*—
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Marubishi Yuka Kogyo Kabushiki Kaisha: *See*—
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Maruyama, Tadanobu: *See*—
Yoshida, Akitoshi; Yanagida, Koichiro; and Maruyama, Tadanobu, 4,006,030.
Marvin Glass & Associates: *See*—
Terzian, Rouben T.; Friederich, Eckehard; and Morrison, Howard J., 4,005,764.
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Washington, James M.; and Marx, Emil A., 4,005,668.
Marzin, Claude Raymond; Rougeaux, Claude Maurice; and Vernes, Patrice Jean Claude, to International Business Machines Corporation. Exclusive or integrated logic circuits using complementary MOSFET technology. 4,006,365, Cl. 307-205.000.
Masaki, Kenji; and Saito, Masaaki, to Nissan Motor Co., Ltd. Warming-up system for internal combustion engines. 4,005,693, Cl. 123-122.00D.
Mason, Dewey; and Mason, Riley C. Folding umbrella table. 4,005,661, Cl. 108-128.000.
Mason, Riley C.: *See*—
Mason, Dewey; and Mason, Riley C., 4,005,661.
Masson Scott Thrissell Engineering Limited: *See*—
Craddy, Richard Adrian, 4,005,627.
Mather, John: *See*—
Malhotra, Virender Nath; and Mather, John, 4,006,111.
Mathou, Marcel Edouard. Assembling piece and application to a panel assembly. 4,005,559, Cl. 52-282.000.
Matsuda, Keizo: *See*—
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Matsudaira, Takeshi; and Nakamura, Shoichi, to Sony Corporation. Transmitting and reproducing system having improved noise reduction characteristics for quadraphonic audio information signals. 4,006,313, Cl. 179-15.0BT.
Matsushita Electric Industrial Co., Ltd.: *See*—
Isono, Tatsuji, 4,006,121.
Izura, Yoshiteru; Tanaka, Masaaki; and Sasaki, Seishi, 4,006,343.
Matsuura, Kazuo; Kuroda, Nobuyuki; Shiraishi, Takeichi; and Miyoshi, Mitsuji, to Nippon Oil Company Ltd. Polymerization of olefins and catalysts therefor. 4,006,101, Cl. 252-429.00C.
Matteson, Orval Q. Liquid treating apparatus. 4,006,085, Cl. 210-195.00S.
Matthews, Russell B., to Johnson Controls, Inc. Control arrangement fail-safe timing circuit. 4,005,585, Cl. 62-158.000.
Maurer, Barbara V.: *See*—
Haugwitz, Rudiger D.; and Maurer, Barbara V., 4,006,137.
Maurer, John W., to General Electric Company. Microwave heating apparatus with multiple coupling elements and microwave power sources. 4,006,339, Cl. 219-10.55F.
Maxim, John H., to Park-Ohio Industries, Inc. Apparatus and method for heating a gun barrel bore. 4,006,337, Cl. 219-8.500.
Mayer, Karl Heinrich; Kabbe, Hans-Joachim; and Otten, Hinrich, to Bayer Aktiengesellschaft. Benzoic acid amides for mycobacterium infections. 4,006,239, Cl. 424-263.000.
Mazzaferro, Nicola: *See*—
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MCA Disco-Vision, Inc.: *See*—
Canino, Lawrence S., 4,006,294.
McCall, William B.; Harper, William J.; and Harper, William P. Rotary internal combustion engine. 4,005,682, Cl. 123-8.190.
McClain Industries Inc.: *See*—
Edwards, Earl S., 4,005,648.
McCloskey, Albert R., to Heim Universal Company, The. Spherical bearing assembly. 4,005,514, Cl. 29-149.50B.
McDonald, William C.: *See*—
Lyman, Frank, Jr.; and McDonald, William C., 4,006,375.
McGraw-Edison Company: *See*—
Robotham, William Frederick; and Annis, Larry D., 4,006,334.
McHose, Robert Edwin: *See*—
Faulkner, Richard Dale; and McHose, Robert Edwin, 4,006,376.
McInerney, Charles E., to Garrett Corporation, The. Method and apparatus for turbocharger control. 4,005,578, Cl. 60-602.000.
McKay, Robert S. Toy vehicle-aircraft combination. 4,005,543, Cl. 46-81.000.
McKenry, Robert J.; and College, Michael A., to Kennametal Inc. Impact or demolition tool. 4,005,906, Cl. 299-91.000.
McKenzie, John K.: *See*—
Porter, William R.; McKenzie, John K.; and Mitenko, Paul A., 4,006,249.
McKerrow, George Clement: *See*—
Themelis, Nickolas John; and McKerrow, George Clement, 4,005,856.
McLaughlin, Russell A.: *See*—
Turner, John W., Jr.; and McLaughlin, Russell A., 4,005,621.
McLaughlin, William L.; Levine, Harry; and Rosenstein, Marvin, to United States of America, Health, Education and Welfare. Photographic polymeric composition containing a leuco dye cyanide. 4,006,023, Cl. 96-90.00R.
McLean, Nathan Cosh, to C.D.B. Europ. Hank dyeing. 4,005,590, Cl. 68-5.00D.
McManamon, Peter Michael, to United States of America, Navy. Filtered transition distortion channel quality monitor. 4,006,303, Cl. 178-69.00A.
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Means, Rodney J.: *See*—
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Measurex Corporation: *See*—
Howarth, John J., 4,006,358.
Mega, Yasunori, to Alps Electric Co., Ltd. Electronic tuning element assembly. 4,006,442, Cl. 338-180.000.
Meguerian, Garbis H.; Hirschberg, Eugene H.; and Rakowsky, Frederick W., to Standard Oil Company (Indiana). Catalyst for treating exhaust gas from internal combustion engine. 4,006,103, Cl. 252-438.000.
Merck & Co., Inc.: *See*—
Bochis, Richard J., 4,006,153.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 4,006,180.
Kahan, Jean S.; Kahan, Frederick M.; Stapley, Edward O.; Goegelman, Robert T.; and Hernandez, Sebastian, 4,006,060.
Rogers, Edward F.; Hannah, John; and Dybas, Richard A., 4,006,143.
Shepard, Kenneth L.; and Paleveda, William J., Jr., 4,006,233.
Veber, Daniel F.; and Hirschmann, Ralph F., 4,006,152.
Meresz, Otto; and Mozsgai, Cecilia. Process for the synthesis of pure isomers of long chain alkenes. 4,006,065, Cl. 204-59.00R.
Mermoz, Henri, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Means for improving the signal/noise ratio of signals picked up by aerials comprising several elements. 4,006,421, Cl. 325-474.000.
Merrifield, D. Bruce; Pawlak, Joseph A.; and Colson, James G., to Hooker Chemicals & Plastics Corporation. Amine phosphite antioxidants. 4,006,117, Cl. 260-45.9NP.
Merrifield, Daniel B., to Healthways. Easily released belt fastener. 4,005,508, Cl. 24-193.000.
Mesek, Frederick K., to Johnson & Johnson. Disposable diaper having tab fasteners provided with a pull string and attached to release surfaces on diaper facing. 4,005,713, Cl. 128-287.000.
Messner, Rudolf; and Weisser, Walter, to Martin Brinkmann AG. Hand device for making cigarettes. 4,005,716, Cl. 131-70.000.
Metallgesellschaft Aktiengesellschaft: *See*—
Jury, Egon, 4,005,987.
Sparwald, Volker, 4,006,066.
Metzger, Julio, to E. R. Squibb & Sons, Inc. Purification of nystatin. 4,006,222, Cl. 424-123.000.
Meumann, Hans: *See*—
Simonsen, Harald; Specht, Hans; Baumgartel, Klaus; and Meumann, Hans, 4,005,610.
Meussdoerffer, Johann Nikolaus: *See*—
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Meyer, Donald G.; and Fancher, James E., to John Fluke Mfg. Co., Inc. Amplifier circuit having integral means for detecting and preventing non-linear operation. 4,006,428, Cl. 330-51.000.
Meyer-Ebrecht, Dietrich, to U.S. Philips Corporation. Circuit arrangement for converting a bridge unbalance into a frequency variation. 4,006,430, Cl. 331-65.000.
Meyer, Willy: *See*—
Bohner, Beat; Dawes, Dag; Kny, Hermann; Meyer, Willy; and Perchais, Jean, 4,006,157.
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Micetich, Ronald G.; Chin, Clinton G.; and Morin, Robert B., to Connlab Holdings Limited. 1,2,4-Dithiaaz-3-enes. 4,006,139, Cl. 260-243.00R.
Michael, Donald S., to Mikron Instrument Company, Inc. Remote reading infrared thermometer. 4,005,605, Cl. 73-355.00R.
Michaelson, Joseph B.: *See*—
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Seferian, Rupen B.; Kaprielian, Roy M.; and Michaelson, Joseph B., 4,006,005.
Michalczyk, Georg; and Gluzek, Karl-Heinz, to Deutsche Texaco Aktiengesellschaft. Process for converting γ-butyrolactone into tetrahydrofuran. 4,006,104, Cl. 252-465.000.

Michalczyk, Georg; and Gluzek, Karl-Heinz, to Deutsche Texaco Aktiengesellschaft. Process for converting maleic anhydride to γ-butyrolactone. 4,006,165, Cl. 260-343.600.

Michals, Theodore T. Bumper impact divertor. 4,005,891, Cl. 293-84.000.

Midwest Biochemical Corporation: *See—*
Weber, Meyer Michael, 4,006,056.

Mihailovici, Paul Constantin: *See—*
Petrescu-Prahova, Iulian Basarab; Mihailovici, Paul Constantin; and Constantinescu, Cristian George, 4,006,366.

Mikita, Marion T.: *See—*
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Mikkelsen, Jorgen; Groves, David Rennie Kingsley; and Herbert, Peter John, to Plastipak (Proprietary) Limited. Collapsible container. 4,005,795, Cl. 220-7.000.

Mikron Instrument Company, Inc.: *See—*
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Miles Laboratories, Inc.: *See—*
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Miller, Charles E.: *See—*
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Miller, Raymond E.: *See—*
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Milshtein, Samson Khaim. Semiconductor devices. 4,005,523, Cl. 29-581.000.

Milsom, Henry Britton Coates: *See—*
Short, Douglas Paviour; Gillon, Donald James; and Milsom, Henry Britton Coates, 4,005,705.

Milton, Thomas J.: *See—*
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Minakata, Masaaki: *See—*
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Mincuzzi, Antonio, to Societe Internationale de Mecanique Industrielle, S.A. Device for remote transmitting pressure signals. 4,006,402, Cl. 323-94.00H.

Miniter, Sylvester F., III: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
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Minolta Camera Kabushiki Kaisha: *See—*
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Minsky, Norman C., to Dart Industries Inc. Lid mount. 4,005,798, Cl. 220-85.0CH.

Mitarai, Hajime, to Canon Kabushiki Kaisha. Read-only memory. 4,006,470, Cl. 340-173.0SP.

Mitenko, Paul A.: *See—*
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Mitida, Minoru: *See—*
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Mitsubishi Petrochemical Company Limited: *See—*
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Mitsugi, Koji: *See—*
Sano, Konosuke; Matsuda, Keizo; Mitsugi, Koji; Yamada, Kazuhiko; Tamura, Fumihide; Yasuda, Naohiko; and Noda, Ichiro, 4,006,057.

Miyamoto, Eddie Kakuo. Adapter with thread protector. 4,005,735, Cl. 138-96.00R.

Miyamoto, Kazuo; Koide, Hideo; and Suzuki, Isao, to Rhythm Watch Company, Limited. Leaf-type digital clock. 4,005,570, Cl. 58-16.00D.

Miyashita, Tsuneo; Sano, Kazuo; Sasaguri, Kyoji; Ishihara, Kazuo; and Hironaka, Shunichi, to Nippon Kokan Kabushiki Kaisha. Device for making high temperature reformed gas. 4,005,986, Cl. 23-288.00R.

Miyoshi, Mitsuji: *See—*
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Chibnik, Sheldon, 4,006,089.
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Model, Ernst; von der Crone, Jost; and Pugin, Andre, to Ciba-Geigy Corporation. Iminoisoindolinone pigments. 4,006,162, Cl. 260-325.0PH.

Moeller, Axel, to Ludwig Mfg. Company, Inc., The. Securing means for panels. 4,005,888, Cl. 292-256.710.

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Mollon, Leslie; and Ball, Keith R., to Brooks & Perkins, Incorporated. Shroud for storing radioactive spent nuclear fuel cells. 4,006,362, Cl. 250-518.000.

Momberger, Richard A.; and Williams, G. Norman, to GTE Sylvania Incorporated. Surface wave frequency selective device. 4,006,290, Cl. 358-196.000.

Monahan, Earnest M.: *See—*
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Monia, Victor, to Guardian Packaging Corporation. Material for, and method of forming, tubular walls for product containers. 4,006,275, Cl. 428-36.000.

Monsanto Company: *See—*
Bollinger, Frederic G.; and D'Amico, John J., 4,006,007.
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Hoge, A. Russell; and Myers, Robert A., 4,005,919.
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Montedison Fibre S.p.A.: *See—*
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Moon, Malcolm W., to Upjohn Company, The. 1'-Formyl-1'-halobenzeneazomethane compounds having herbicidal activity. 4,006,132, Cl. 260-192.000.

Moore, Bruce H.; and Houk, Richard D., to Samuel Moore and Company. Motion transfer system. 4,005,614, Cl. 74-501.00R.

Moore, Donn F., to Computer Peripherals, Inc. Print hammer. 4,005,650, Cl. 101-111.000.

Moore, Robert G. Maternity supporter. 4,005,715, Cl. 128-579.00R.

Moore, Robert R. Adjustable strap assembly. 4,005,506, Cl. 24-68.00E.

Morabito, Salvatore L.: *See—*
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Morawe, Hans-Georg: *See—*
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Morgan, Charles R., to W. R. Grace & Co. Solid curable polyene compositions and method of coating therewith. 4,006,270, Cl. 427-54.000.

Morin, Robert B.: *See—*
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Morisaki, Nobukazu, to Daido Metal Company, Ltd. Gear pump. 4,005,952, Cl. 418-131.000.

Moritz, Karl-Ludwig; and Schundehutte, Karl-Heinz, to Bayer Aktiengesellschaft. Azo dyestuffs containing aminopyridone culpling component. 4,006,128, Cl. 260-156.000.

Morris, Cletus E.: *See—*
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Morrison, Charles R.: *See—*
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Morrison, Howard J.: *See—*
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Morrison, Robert C.: *See—*
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Morrow, James G., Sr.; and Pech, David J., to Manitowoc Company, Inc., The. Boom stop and back hitch compensating system. 4,005,780, Cl. 212-8.00R.

Morse, William E., Jr. Lightweight pasture harrow. 4,005,756, Cl. 172-643.000.

Moser, Erwin; and Morawe, Hans-Georg, to Swiss Aluminium Ltd. Process for the recovery of fluorine from an aqueous solution. 4,006,214, Cl. 423-112.000.

Mosler Safe Company, The: *See—*
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Moulding, Thomas S., Jr. Variable size intrauterine contraceptive device. 4,005,707, Cl. 128-130.000.

Moutou, Paul-Cyril; and Godart, Jean-Jacques, to Thomson-CSF. Cathode for gunn diode and gunn diode comprising such a cathode. 4,006,490, Cl. 357-3.000.

Mouzin, Gilbert: *See—*
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Mueller, William A., to Block Engineering, Inc. Method of discriminating between dyed particles and background fluorescence of the dye. 4,006,360, Cl. 250-461.00B.

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Mullersman, Ferdinand H.: *See—*
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Mummery, Herbert L.; and Hoffmann, Robert T., to United States of America, Navy. Submersible load cell for measuring gas buoyancy. 4,005,606, Cl. 73-438.000.

Murch, Robert F., to Schlage Lock Company. Door lock strike guard. 4,005,890, Cl. 292-346.000.

Murphy Pacific Marine Salvage Co.: *See*—
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Musser, Malcolm E. Bag storing and dispensing apparatus. 4,005,801, Cl. 221-56.000.

Mutch, Henry, to Rohr Industries, Inc. Target thrust reverser. 4,005,836, Cl. 244-110.00B.

Muusse, Jay H., to Tuff-Ten Corporation. Method and apparatus for casting extrusion dies. 4,005,511, Cl. 29-33.00C.

Muzyka, Donald R.; and Schlosser, Donald K., to Carpenter Technology Corporation. Controlled expansion alloy. 4,006,011, Cl. 75-122.000.

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Myers, Walter I.; Goodbary, Edgar R.; Thomas, Richard L.; Lewis, Billy W.; and Bartley, Francis A., to Goodbary Engineering Co. Floor jack. 4,005,850, Cl. 254-2.00R.

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Nadelson, Jeffrey, to Sandoz, Inc. Alkyl-p-pivaloylbenzylaminomethylbenzophenones. 4,006,248, Cl. 424-316.000.

Nafissi-Varchei, Mohammad Mehdi, to Schering Corporation. Certain benzothiazoles used in the treatment of helminthiasis. 4,006,242, Cl. 424-270.000.

Nahon, Abraham S. Plant support. 4,005,548, Cl. 47-45.000.

Nakagawa, Yasuichi, to Kabushiki Kaisha Daini Seikosha. Electric micro motor for a timepiece. 4,006,374, Cl. 310-40.0MM.

Nakamura, Nobutaka; and Saeki, Yukio, to Sumitomo Durez Company, Ltd. Method for preventing gelation of thermosetting resins in waste water. 4,006,081, Cl. 210-58.000.

Nakamura, Shoichi: *See*—
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Nalco Chemical Company: *See*—
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Narbaits-Jaureguy, Jean-Raymond; and Billottet, Henri, to Thomson-CSF. Audibility-control system for radio receiver. 4,006,447, Cl. 340-33.000.

Nason, Robert W. Window screen assembly tool. 4,005,737, Cl. 140-109.000.

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National Union Electric Corporation: *See*—
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Nelson, Terrance D.; and Kuntzsch, Donald W., to Allen-Bradley Company. Electrical terminal structure. 4,006,323, Cl. 200-284.000.

Nerenberg, Robert W.; and Herzog, Frank B., to Interstate Folding Box Company, The. Carton with self-contained reinforced handle. 4,005,815, Cl. 229-52.00B.

Nestor, Charles R., to General Motors Corporation. Universal wedge base lamp socket. 4,005,924, Cl. 339-17.00D.

Netteland, Loyal G.; and Heintz, Clifford E., to A-T-O Inc. Apparatus for endothermal absorption of carbon dioxide. 4,005,708, Cl. 128-142.00R.

Netzer, James V.: *See*—
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New Hampshire Ball Bearings, Inc.: *See*—
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Yoshida, Mitsutaka; and Sakai, Masao, 4,006,106.

Nichibei Fuji Cycle Co., Ltd.: *See*—
Ohtani, Tadakatsu, 4,005,874.

Nichol, Charles A.: *See*—
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., 4,006,235.

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Nikkel, Willem A., to Westvaco Corporation. Corrugating station assembly guide. 4,005,529, Cl. 33-181.00R.

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Ninke, William Herbert: *See*—
Candy, James Charles; Freeny, Stanley Leon; and Ninke, William Herbert, 4,006,475.

Nippon Electric Company, Ltd.: *See*—
Koga, Toshio, 4,006,297.
Sato, Yoichi, 4,006,352.

Nippon Kokan Kabushiki Kaisha: *See*—
Miyashita, Tsuneo; Sano, Kazuo; Sasaguri, Kyoji; Ishihara, Kazuo; and Hironaka, Shunichi, 4,005,986.

Nippon Oil Company Ltd.: *See*—
Matsuura, Kazuo; Kuroda, Nobuyuki; Shiraishi, Takeichi; and Miyoshi, Mitsuji, 4,006,101.

Nippon Steel Corporation: *See*—
Nishihara, Toshiro; Takahashi, Nobuyuki; Katoh, Hiroshi; and Ishimaru, Touru, 4,005,665.
Oya, Tatsuo; Motoyoshi, Minoru; Okamoto, Masfumi; Tanaka, Kiyoshi; and Sugiyama, Takayasu, 4,006,044.

Nippondenso Kabushiki Kaisha: *See*—
Kawai, Noriaki; Okamoto, Hisaji; Takeda, Yosiaki; Sano, Fukuzi; Kakiuchi, Akio; Manabe, Masami; Nomura, Takashi; and Abe, Sigeya, 4,005,688.

Nishida, Takashi: *See*—
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Nishihara, Toshiro; Takahashi, Nobuyuki; Katoh, Hiroshi; and Ishimaru, Touru, to Nippon Steel Corporation. Method for making press-working blanks with reduced ear occurrence. 4,005,665, Cl. 113-116.00V.

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Nishikawa, Masao, to Shin-Shirasuna Electric Corporation. Automatic gain control circuit. 4,006,427, Cl. 330-29.000.

Nishiyama, Yoshiyuki: *See*—
Tamai, Yasukatsu; Nishiyama, Yoshiyuki; and Mitida, Minoru, 4,005,995.

Nisimura, Isao: *See*—
Hayashi, Tadashi; and Nisimura, Isao, 4,006,327.

Nissan Chemical Industries, Ltd.: *See*—
Yoshida, Akitoshi; Yanagida, Koichiro; and Maruyama, Tadanobu, 4,006,030.

Nissan Motor Co., Ltd.: *See*—
Hayashi, Tadashi; and Nisimura, Isao, 4,006,327.
Masaki, Kenji; and Saito, Masaaki, 4,005,693.

Nisshin Kogyo Kabushiki Kaisha: *See*—
Takeuchi, Hiroo, 4,005,638.

Nitsch, J. Leonard. Holder and shear ledger plate for package tying machines. 4,005,563, Cl. 53-138.00A.

Nobile, Humberto. Modular alarm circuit. 4,006,451, Cl. 340-63.000.

Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera systems for providing precise exposures with digital light measurement. 4,006,484, Cl. 354-23.00D.

Noda, Ichiro: *See*—
Sano, Konosuke; Matsuda, Keizo; Mitsugi, Koji; Yamada, Kazuhiko; Tamura, Fumihide; Yasuda, Naohiko; and Noda, Ichiro, 4,006,057.

Noda, Taizo, to Kohshoh Limited. Plastic clip. 4,005,510, Cl. 24-250.00R.

Noe, John B., to Plasmatronics Company, The. Electronic ignition system. 4,005,694, Cl. 123-148.00E.

Nofziger, Neil B., to Owens-Illinois, Inc. Sealing glass compositions and pastes and use thereof. 4,006,028, Cl. 106-47.00R.

Nohira, Hidetaka; Bessho, Hironori; and Sakai, Yasuyuki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine exhaust manifold with cylindrical built-in catalyst container. 4,005,576, Cl. 60-302.000.

Nohira, Hidetaka; and Sugiura, Masatoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Carburetor arranged for recirculating exhaust gases. 4,005,692, Cl. 123-119.00A.

Noll, Klaus-Reinhold: *See*—
Keck, Johannes; Noll, Klaus-Reinhold; Pieper, Helmut; Kruger, Gerd; and Puschmann, Sigfrid, 4,006,246.

Nomura, Takashi: *See*—
Kawai, Noriaki; Okamoto, Hisaji; Takeda, Yosiaki; Sano, Fukuzi; Kakiuchi, Akio; Manabe, Masami; Nomura, Takashi; and Abe, Sigeya, 4,005,688.

Nomura, Toshio: *See*—
Hirosawa, Yoshiaki; Nomura, Toshio; and Iiyama, Masahiko, 4,005,690.

Noranda Mines Limited: *See*—
Themelis, Nickolas John; and McKerrow, George Clement, 4,005,856.

North American Philips Corporation: *See*—
Bruning, Harvey R., 4,006,389.

Northern Telecom Limited: *See*—
Dalgleish, Jack Frank; and Lukas, Helmut Hans, 4,005,522.

Norton, Joseph R.; and Scisson, Sidney E. Fluid operated rotor. 4,005,947, Cl. 416-197.00A.

Novak, Raymond F.: *See—*
Doyle, Richard H.; Morabito, Salvatore L.; Yohana, Andrew I.; and Novak, Raymond F., 4,005,812.

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Nussbaumer, Thomas, to Patent & Inventions Ltd. Apparatus for rotating and displacing in axial direction a machine element. 4,005,641, Cl. 92-2.000.

Nutting, Robert G., to Continental Can Company, Inc. Blow molding machine. 4,005,966, Cl. 425-326.00B.

Nyrop, Per: *See—*
Charlton, Andrew Paul; Lewis, Kenneth Dan; Willus, Charles Arthur; and Nyrop, Per, 4,005,817.

Occidental Petroleum Corporation: *See—*
Cha, Chang Yul, 4,005,752.

Ochiai, Tatsushiro: *See—*
Sugisaki, Takao; Ochiai, Tatsushiro; Nishikawa, Kyoichi; and Higurashi, Minoru, 4,006,408.

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Ochsner, Paul Albert; and Schenk, Hanspeter, to Givaudan Corporation. Z-ethyl-3,6,6-trimethyl-2-cyclohexene-1-carboxylic acid esters. 4,006,108, Cl. 252-522.000.

Ochsner, Paul Albert; and De Polo, Karl-Fred, to Givaudan Corporation. Trimethyl nonene alcohols and perfume compositions. 4,006,109, Cl. 252-522.000.

O'Connor, Bernard J.: *See—*
Lanni, Michael J.; Calamera, John; Krebs, Leon; and O'Connor, Bernard J., 4,005,608.

O'Connor, Michael Niall Desmond: *See—*
Panzer, Hans Peter; O'Connor, Michael Niall Desmond; and Baccei, Louis J., 4,006,247.

Oe, Yoshikazu: *See—*
Uebayasi, Yositaka; Kumon, Hiroshi; Yamada, Michinobu; and Oe, Yoshikazu, 4,005,991.

Ofenleger, Gerd. Vehicle burglar alarm with interior control switch. 4,006,450, Cl. 340-63.000.

Ogawa, Yoshikatsu; Kasahara, Takeshi; and Hisada, Haruhiko, to Marubishi Yuka Kogyo Kabushiki Kaisha; and Mitsubishi Petrochemical Company Limited. Flame-retardant thermoplastic polymer compositions. 4,006,118, Cl. 260-45.75B.

Ogden, Cameron S.: *See—*
Fedor, Robert J.; and Ogden, Cameron S., 4,006,105.

Ogle, Leo D., to Raymond Lee Organization, Inc., The, a part interest. Adjustable strength anchor. 4,005,671, Cl. 114-298.000.

Ohata, Keiichi: *See—*
Toba, Hirotaka; Ohata, Keiichi; and Tsukane, Nagayoshi, 4,006,208.

Ohdan, Kyoji: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,006,167.

Ohio State University, The: *See—*
Young, Jonathan D.; Davis, Curtis W., III; Peters, Leon, Jr.; and Caldecott, Ross, 4,006,481.

Ohki, Eiji; Saeki, Hiromichi; and Sugawara, Shinichi, to Sankyo Company Limited. Aminoglycoside antibiotics. 4,006,133, Cl. 536-17.000.

Ohta, Jun: *See—*
Arai, Hiroshi; and Ohta, Jun, 4,006,448.

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Kanda, Kimio; and Ohtaka, Tadashi, 4,006,357.

Ohtani, Tadakatsu, to Nichibei Fuji Cycle Co., Ltd. Means for supporting a reflector attaching bracket for a bicycle. 4,005,874, Cl. 280-289.00H.

Ohtsuka, Shuichi; Taguchi, Seiichi; and Honjo, Satoru, to Fuji Photo Film Co., Ltd. Recording process utilizing supercooled organic compounds. 4,006,022, Cl. 96-48.00R.

Okamoto, Hisaji: *See—*
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Okamoto, Kintaro; Kudo, Hirokatu; Kadoiri, Etsuro; and Soma, Hiroshi, to Pioneer Electronic Corporation; and Honda Giken Kogyo Kabushiki Kaisha. Car loud speaker. 4,005,761, Cl. 181-141.000.

Okamoto, Masfumi: *See—*
Oya, Tatsuo; Motoyoshi, Minoru; Okamoto, Masfumi; Tanaka, Kiyoshi; and Sugiyama, Takayasu, 4,006,044.

Old Fort International, Inc.: *See—*
Balhorn, Milo G., 4,005,973.

Olin Corporation: *See—*
Tobin, John H.; and Wojtowicz, John A., 4,006,185.

Olsen, Dick Merlin; Armstrong, Charles H.; and Brock, Gordon L., to Clayton Manufacturing Company. Engine performance analyzer. 4,006,403, Cl. 324-15.000.

Olympus Optical Co., Ltd.: *See—*
Ichikawa, Kazuo, 4,006,368.

Omron Tateisi Electronics Co.: *See—*
Hayashi, Tadashi; and Nisimura, Isao, 4,006,327.

Ono, Hisatake: *See—*
Yamashita, Hiroshi; Sekikawa, Nobuyoshi; and Ono, Hisatake, 4,006,021.

Onodera, Toshio, to Sony Corporation. Horizontal deflection circuit. 4,006,385, Cl. 315-400.000.

Oono, Takashi: *See—*
Hirose, Mitsuo; Oono, Takashi; and Ueno, Makoto, 4,005,770.

Opie, William R.: *See—*
Rajcevic, Harold P.; Opie, William R.; and Cusanelli, Dominic C., 4,006,010.

Oprandi, Pierre; and Romeas, Rene, to Thomson-Brandt. Method of detecting defects in signals corresponding to the read-out of a data carrier and system for implementing such a method. 4,006,295, Cl. 358-127.000.

Oswald, William J., to University of California, The Regents of the. Method of waste treatment and algae recovery. 4,005,546, Cl. 47-1.400.

Otake, Minoru: *See—*
Takahashi, Bunzo; Tachibana, Hiroshi; and Otake, Minoru, 4,005,530.

O'Toole, Joseph J., to Lawrence Peska Associates, Inc., a part interest. Coating and staining material collecting device. 4,005,678, Cl. 118-505.000.

Ott, Eduard Karl, to Frontier Machinery Company. Solid state alternating current switching device. 4,006,367, Cl. 307-252.00B.

Otten, Hinrich: *See—*
Mayer, Karl Heinrich; Kabbe, Hans-Joachim; and Otten, Hinrich, 4,006,239.

Outokumpu Oy: *See—*
Makipirtti, Simo Antero Iivari; and Relander, John Henrik, 4,006,013.

Owens-Corning Fiberglas Corporation: *See—*
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Roberson, Cletis L., 4,005,505.

Owens-Illinois, Inc.: *See—*
Daiga, Valdis R., 4,006,003.
Nofziger, Neil B., 4,006,028.

Oya, Tatsuo; Motoyoshi, Minoru; Okamoto, Masfumi; Tanaka, Kiyoshi; and Sugiyama, Takayasu, to Nippon Steel Corporation. Steel slab containing silicon for use in electrical sheet and strip manufactured by continuous casting and method for manufacturing thereof. 4,006,044, Cl. 148-31.550.

Pace, W. David, to Motorola, Inc. Tachometer. 4,006,417, Cl. 324-166.000.

Pacific Pneumatics, Inc.: *See—*
Royston, Mark William, 4,006,349.

Packard, Robert B.: *See—*
Gladwin, Floyd R.; and Packard, Robert B., 4,005,789.

Page, John S., Jr. Deep well safety valve. 4,005,751, Cl. 166-321.000.

Palazzolo, Salvatore E.: *See—*
Cannady, Daniel L., Jr.; and Palazzolo, Salvatore E., 4,006,048.

Paleveda, William J., Jr.: *See—*
Shepard, Kenneth L.; and Paleveda, William J., Jr., 4,006,233.

Palz, Helmut; Hebel, Rudolf; and Bauersachs, Otto, to Didier-Werke AG. Hot-blast stove for a blast furnace. 4,005,982, Cl. 432-248.000.

Pamlin, Roland, to Svenska Rotor Maskiner Aktiebolag. Rotary internal combustion engine with liquid cooled piston. 4,005,955, Cl. 418-94.000.

Panzer, Hans Peter; O'Connor, Michael Niall Desmond; and Baccei, Louis J., to American Cyanamid Company. Unsaturated imidazolines. 4,006,247, Cl. 260-309.600.

Pappas, Michael, to Detex Corporation. Emergency exit lock system for doors. 4,006,471, Cl. 340-274.00R.

Park-Ohio Industries, Inc.: *See—*
Maxim, John H., 4,006,337.

Parkash, Dharam: *See—*
Bhuchar, Vishwa Mitra; Agrawal, Arun Kumar; Kiss, Franz; Vasisht, Jayanti Prasad; Parkash, Dharam; and Srivastava, Oudh Narain Lal, 4,006,062.

Parker, Dawood, to G. D. Searle & Co. Limited. Device for measuring blood gases. 4,005,700, Cl. 128-2.00E.

Parker-Hannifin Corporation: *See—*
Petrick, John T., 4,005,503.

Parker, Robert, to University of California, The Regents of the. Indicating device. 4,006,414, Cl. 324-106.000.

Pas, Henricus Gerhardus Hermanus Maria. Method and apparatus for pre-incubating eggs. 4,005,679, Cl. 119-35.000.

Pasch, Lambert M., to Uniroyal A.G. Multi-cavity mold loading apparatus. 4,005,783, Cl. 214-1.0BB.

Pasquali, Marco: *See—*
Calderazzo, Fausto; Pasquali, Marco; and Garibaldi, Pierpaolo, 4,006,174.

Pastan, Harvey L.; and Solomon, Arthur H., to Arthur D. Little, Inc. Digital communication system. 4,006,416, Cl. 325-30.000.

Patent & Inventions Ltd.: *See—*
Nussbaumer, Thomas, 4,005,641.

Paton, Anthony David: *See—*
Heath, Christopher Edmund James; Paton, Anthony David; and Reeve, David Anthony, 4,006,482.

Patrick, Cecil W. Security device for windows. 4,005,889, Cl. 292-262.000.

Patrick, Dale M., to Adler, Nathan A., a part interest. Apparatus for separating a bullet from a cartridge case. 4,005,630, Cl. 86-1.00A.

Patrizio, Frederick J.: *See—*
Klug, Sigmund L.; Patrizio, Frederick J.; and Einstman, William J., 4,006,263.

Patterson, Garvin Wesley; Shelly, William A.; Calle, Jaime; and Monahan, Earnest M., to Honeywell Information Systems, Inc. Programmable interface apparatus and method. 4,006,466, Cl. 340-172.500.

Patton, David L., to Eastman Kodak Company. Figure eight fluid flow pattern mixing apparatus. 4,005,854, Cl. 259-4.00R.

Paulonis, Daniel Francis; Duvall, David Scott; and Sikorowicz, Gerard Casimer, to United Technologies Corporation. Interlayer for transient liquid phase diffusion bonding. 4,005,988, Cl. 29-194.000.

Pawlak, Joseph A.: *See—*
Merrifield, D. Bruce; Pawlak, Joseph A.; and Colson, James G., 4,006,117.

Payakov, Stefan Georgiev: *See—*
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Pearson, James M.: *See—*
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Pech, David J.: *See—*
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Peck, James V.: *See—*
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Peck, Peter Eric: *See—*
Scott, Alexander; and Peck, Peter Eric, 4,005,575.

Peddle, Charles I.: *See—*
Hepworth, Edward C.; Means, Rodney J.; and Peddle, Charles I., 4,006,457.

Pellar, Marshall. Hand drying and conditioning material. 4,006,094, Cl. 252-194.000.

Pemberton, Troy J., to Phillips Petroleum Company. Control method including feedforward signal. 4,006,346, Cl. 235-150.100.

Pennsylvania Wire Rope Corporation: *See—*
Kaufman, Alan D.; Reistad, Arne M., Jr.; and Wilke, David J., 4,005,613.

Penque, Ronald A., to Biocel Corporation. Fertilizer. 4,006,006, Cl. 71-14.000.

Pepsico Inc.: *See—*
Ratliff, Roger D., 4,005,788.

Perchais, Jean: *See—*
Bohner, Beat; Dawes, Dag; Kny, Hermann; Meyer, Willy; and Perchais, Jean, 4,006,157.

Perl, Richard L., to Tappan Company, The. Gas cook top. 4,005,697, Cl. 126-39.00E.

Perry, Kenneth E., to Dynetics Corporation. Abrasive flow machining method and tooling. 4,005,549, Cl. 51-8.00H.

Peszeszer, Endre F., to General Atomic Company. Method and apparatus for stressing a tendon and banding a structure. 4,005,828, Cl. 242-7.210.

Peters, David H.: *See—*
Brown, Leon Henry, Jr.; and Peters, David H., 4,006,372.

Peters, Leon, Jr.: *See—*
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Peterson, Christopher Ernest, to U.S. Philips Corporation. Method of and apparatus for testing a two dimensional pattern. 4,006,296, Cl. 358-106.000.

Peterson, Theodore J.: *See—*
Stragier, Marcel G.; and Peterson, Theodore J., 4,005,791.

Petit, Roger M.: *See—*
Schulman, Charles; and Petit, Roger M., 4,005,792.

Petrescu-Prahova, Iulian Basarab; Mihailovici, Paul Constantin; and Constantinescu, Cristian George, to Institutul de Fizica. Semiconductor device with memory effect. 4,006,366, Cl. 307-238.000.

Petrick, John T., to Parker-Hannifin Corporation. Windshield wiper blade refill. 4,005,503, Cl. 15-250.420.

Petro-Tex Chemical Corporation: *See—*
Kerr, Ralph O., 4,006,168.

Petry, Eduard C., to Speedaddress, Inc. Addressing machine and variable drag drive therefore. 4,005,652, Cl. 101-131.000.

Pfarrwaller, Erwin, to Sulzer Brothers Limited. Eccentric mechanism for driving a plurality of heddle carrying frames. 4,005,736, Cl. 139-79.000.

Pfeiffer, Michael: *See—*
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Pfiz, Manfred: *See—*
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Pfizer Inc.: *See—*
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Phenolchemie GmbH: *See—*
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Philip Morris Incorporated: *See—*
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Phillips, Irvin J., to Beloit Corporation. Air knife coater top lip scrubber. 4,005,676, Cl. 118-63.000.

Phillips Petroleum Company: *See—*
Crawford, William V., 4,005,968.
Hutson, Thomas, Jr., 4,005,985.
Pemberton, Troy J., 4,006,346.

Pichard, Joseph Francis Louis John. Projectiles for air arms. 4,005,660, Cl. 102-92.100.

Pickenhagen, Wilhelm; Dietrich, Paul; Keil, Borivoj; and Lederer, Edgar, to Firmenich S.A. Flavoring with mixtures of theobromine and cyclic dipeptides. 4,006,261, Cl. 426-537.000.

Pieper, Helmut: *See—*
Keck, Johannes; Noll, Klaus-Reinhold; Pieper, Helmut; Kruger, Gerd; and Puschmann, Sigfrid, 4,006,246.

Pierce, John N., to Signatron, Inc. Signal multiplier devices. 4,006,353, Cl. 235-194.000.

Pierotti, Reno U.: *See—*
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Pierre Fabre S.A.: *See—*
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Pignocco, Arthur J.: *See—*
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Pioneer Electronic Corporation: *See—*
Okamoto, Kintaro; Kudo, Hirokatu; Kadoiri, Etsuro; and Soma, Hiroshi, 4,005,761.

Pitt, Harold M.: *See—*
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Plasmatronics Company, The: *See—*
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Plastic Forming Company, Inc., The: *See—*
Schurman, Peter T., 4,005,800.

Plastipak (Proprietary) Limited: *See—*
Mikkelsen, Jorgen; Groves, David Rennie Kingsley; and Herbert, Peter John, 4,005,795.

Plastofilm Industries, Inc.: *See—*,
Seeley, Leonard, 4,005,776.

Ploger, Walter; Schindler, Norbert; and Worms, Karl-Heinz, to Henkel & Cie G.m.b.H. Process for the preparation of 1-aminoalkane-1,1-diphosphonic acids. 4,006,182, Cl. 260-502.500.

Plote, Hans-Otto, to Werner Nordmeyer Ing. Erben KG. Hydraulically operated drilling apparatus. 4,005,851, Cl. 254-139.000.

Pocket Socks Corporation, The: *See—*
Burn, William H., 4,005,494.

Podowski, Robert R.; and Collins, Johnny, to Zenith Radio Corporation. Digital remote control system with signal verification. 4,006,462, Cl. 340-168.00B.

Pogge, H. Bernhard: *See—*
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Polaroid Corporation: *See—*
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Charkoudian, John C., 4,006,036.
Greenwald, Richard B., 4,006,150.
Swank, Thomas F.; and Waack, Richard, 4,006,025.

Polastri, John D., to Xerox Corporation. Overcoated electrostatographic photoreceptor. 4,006,020, Cl. 96-1.500.

Poletto, John Frank: *See—*
Bernady, Karel Francis; Poletto, John Frank; and Weiss, Martin Joseph, 4,006,179.

Polysius AG: *See—*
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Pond, Charles W., to Hughes Aircraft Company. Wide bandwidth crystal frequency discriminator circuit. 4,006,424, Cl. 329-117.000.

Ponsgen, Karl Otto. Loudspeaker arrangement. 4,006,308, Cl. 179-1.00E.

Pont-A-Mousson S.A.: *See—*
Lorthiois, Thierry Antoine, 4,005,849.

Porter, Lawrence C., to Upjohn Company, The. Apparatus for continuous production of rectangular cross-sectioned foamed plastic bunstock. 4,005,958, Cl. 425-89.000.

Porter, Virgil V. Continuous library catalog card. 4,005,810, Cl. 226-6.000.

Porter, William R.; McKenzie, John K.; and Mitenko, Paul A., to American Home Products Corporation. Systemic treatment of psoriasis. 4,006,249, Cl. 424-326.000.

Portz, William E.; and Fileger, Eugene W., to True Temper Corporation. Game racket string suspension. 4,005,862, Cl. 273-73.00D.

Poulson, Roger: *See—*
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Powell, James E., to Shell Oil Company. 3-Alkyl-2-(nitromethylene) thiazolidine. 4,006,156, Cl. 260-306.70R.

Pratt & Lambert, Inc.: *See—*
Wolinski, Leon E.; Endress, Arthur R.; and Teloh, David W., 4,006,273.

Pravin, Parekh C., to TRW Inc. Method for compensating for emitter-push effect in the fabrication of transistors. 4,006,046, Cl. 148-187.000.

Preformed Line Products Company: *See—*
Simpson, Herbert John; and Heller, Walter, 4,005,560.

Prener, Jerome S.: *See—*
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Presley, C. Travis: *See—*
Argabright, Perry A.; Presley, C. Travis; and Wenger, Charles B., 4,006,098.

Preston, Noel Butters, to United Technologies Corporation. Coated superalloy article. 4,005,989, Cl. 29-194.000.

Priest, Glen R. Oil reclaiming device. 4,006,084, Cl. 210-180.000.

Prober, Maurice: *See—*
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Procter & Gamble Company, The: *See—*
Heckert, David C.; and Watt, David M., Jr., 4,006,176.
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Protz, John E.: *See—*
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Prouse, Ronald Earnest; West, Anthony Alfred; King, Derek Anthony; and Poulson, Roger, to Carreras Rothmans Limited. Smoking materials. 4,005,718, Cl. 131-140.00C.

Prudden, John Fletcher, to Lescarden Ltd. Method and agent for

treating inflammatory disorders of the gastrointestinal tract. 4,006,224, Cl. 424-180.000.

Pruss, John M.: *See—*
Steinman, Robert J., Jr.; Pruss, John M.; and Joseph, Leonard G., 4,006,285.

PSC Technology Inc.: *See—*
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Ptaszek, George W.; and King, James A., to Hasbro Development Corporation. Eye shifting mechanism for doll construction. 4,005,545, Cl. 46-167.000.

Pucci, Fioravante: *See—*
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Pugin, Andre: *See—*
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Pukaite, Clifford Joseph, to Globe-Union Inc. Low temperature coefficient of resistivity cermet resistors. 4,006,278, Cl. 428-427.000.

Punches, James R.: *See—*
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Purdue Research Foundation: *See—*
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Purdy, David L., to ARCO Medical Products Company. Heat reflecting tape for thermoelectric converter. 4,006,038, Cl. 136-225.000.

Purdy, David L., to ARCO Medical Products Company. Component for thermoelectric generator. 4,006,039, Cl. 136-237.000.

Puschmann, Sigfrid: *See—*
Keck, Johannes; Noll, Klaus-Reinhold; Pieper, Helmut; Kruger, Gerd; and Puschmann, Sigfrid, 4,006,246.

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Quate, Calvin F.; and Cunningham, James A., to Leland Stanford Junior University, The Board of Trustees of. Acoustic imaging apparatus. 4,006,444, Cl. 340-15.000.

Quirke, Patric C., to Whitewater Electronics, Inc. Electroacoustical transducer comprising piezoelectric element. 4,006,371, Cl. 310-8.200.

R. T. Vanderbilt Company, Inc.: *See—*
Beadle, Howard C.; and Gibbs, Irving, 4,006,119.

Rajadhyaksha, Vithal J.; Peck, James V.; and Fairbairn, William D., to Nelson Research & Development Company. Phosphoric acid diesters. 4,006,204, Cl. 260-958.000.

Rajcevic, Harold P.; Opie, William R.; and Cusanelli, Dominic C., to Amax Inc. Production of blister copper directly from dead roasted-copper-iron concentrates using a shallow bed reactor. 4,006,010, Cl. 75-74.000.

Rakowsky, Frederick W.: *See—*
Meguerian, Garbis H.; Hirschberg, Eugene H.; and Rakowsky, Frederick W., 4,006,103.

Ramey, Harry Borders. Combination heat pump and low temperature solar heat collector. 4,005,583, Cl. 62-2.000.

Ratkovich, John M. Adjustable arm support. 4,005,840, Cl. 248-118.000.

Ratliff, Roger D., to Pepsico Inc. Vehicular delivery ramp apparatus. 4,005,788, Cl. 214-77.00P.

Rauch, Stewart E., Jr.: *See—*
Fisher, Thomas W.; Rauch, Stewart E., Jr.; and Steinbicker, Richard N., 4,006,213.

Raue, Roderich; and Dorsch, Hans-Lothar, to Bayer Aktiengesellschaft. Cationic diazacyanine dyestuffs. 4,006,127, Cl. 260-146.00R.

Raulerson, Theodore R., Jr.: *See—*
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Rauthmann, Axel; and Spiegel, Erwin, to Ford Motor Company. Vehicle roof with moveable panel. 4,005,900, Cl. 296-137.00B.

Rayment, John, to Samuel Pegg & Son Limited. Finishing of textiles. 4,005,500, Cl. 8-149.100.

Raymond Lee Organization, Inc., The: *See—*
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Raytheon Company: *See—*
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RCA Corporation: *See—*
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Redfern, Calvin E., to Allis-Chalmers Corporation. Offset pivot ground switch. 4,006,325, Cl. 200-48.00A.

Redman, John David; and Wall, Michael Richard, to National Research Development Corporation. Interferometric methods and apparatus for measuring distance to a surface. 4,005,936, Cl. 356-5.000.

Redmann, Ulrich: *See—*
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Reesen, Jorgen, to Eastman Kodak Company. Apparatus for the control of photosensitive material handling and cutting operations in computer output microfilmers. 4,006,395, Cl. 318-685.000.

Reeve, David Anthony: *See—*
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Regal Tool & Rubber Co. Inc.: *See—*
Files, James Harold, 4,005,672.

Regie Nationale des Usines Renault: *See—*
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Rehag, Klaus: *See—*
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Reilly, Dale Robert: *See—*
Brown, Bertrand Hirsch; DeTolla, Francis Louis; and Reilly, Dale Robert, 4,005,946.

Reilly, Mason J., to United States of America, Navy. Crash load attenuating troop seat. 4,005,765, Cl. 188-1.00C.

Reinecke, Erich: *See—*
Klatt, Alfred; Lindemann, Klaus; Luhdorff, Dieter; and Reinecke, Erich, 4,005,911.

Reisinger, Konrad, to Siemens Aktiengesellschaft. Switching arrangement for extending the receiver stop pulse length in time division multiplex transmission. 4,006,302, Cl. 178-50.000.

Reistad, Arne M., Jr.: *See—*
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Relander, John Henrik: *See—*
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Remington Arms Company, Inc.: *See—*
Alday, James Marion; and Rowlands, Kenneth Charles, 4,005,695.

Rensland, Thomas E.; Clawson, Robert C.; and Karrip, Alexander A., to Steelcase, Inc. Chair base arm end cap. 4,005,841, Cl. 248-188.700.

Reth, Erich; and Gockel, Hans, to Demag Aktiengesellschaft. Roll changing mechanism for rolling mills. 4,005,594, Cl. 72-239.000.

Rettore, Roberto; and Gatta, Giorgio, to Montecatini Edison S.p.A. Process for the chlorination of vinyl polymers. 4,006,126, Cl. 526-17.000.

Reynard, Kennard A.; and Gerber, Arthur H., to Horizons Incorporated a division of Horizons Research Incorporated. Curable polyphosphazenes. 4,006,125, Cl. 260-77.5AQ.

Rheinisch-Westfallisches Elektrizitatswerk Aktiengesellschaft: *See—*
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Rhythm Watch Company, Limited: *See—*
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Ribka, Joachim: *See—*
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Richard Wolf GmbH: *See—*
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Richardson Company, The: *See—*
Tirpak, Michael R.; Schouten, James J.; and Green, Charles E., 4,006,037.

Richardson, Ralph G.; and Vitron, William J., to Hoover Ball and Bearing Company. Pillow block and apparatus for making same. 4,005,917, Cl. 308-72.000.

Richmond, James W., to Stryker Corporation. Solution bottle holder. 4,005,844, Cl. 248-311.300.

Rickel, William R.; and Mueller, Dale Edward, to Whirlpool Corporation. Hose connector for automatic washer. 4,005,882, Cl. 285-194.000.

Riddel, John W., to General Motors Corporation. Pressure control valve. 4,005,733, Cl. 137-625.400.

Riedel, Franz: *See—*
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Rifkin, Ellis B.: *See—*
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Niebylski, Leonard M.; and Rifkin, Ellis B., 4,005,993.

Rigney, John T. Automobile anti-glare shield. 4,005,899, Cl. 296-97.00E.

Rischert, Karl; and Drossler, Peter. Ski-pole grip having releasable strap attachment. 4,005,872, Cl. 280-11.37H.

Robbins, Gordon Jay: *See—*
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Roberson, Cletis L., to Owens-Corning Fiberglas Corporation. Method of producing a sliver-like fibrous element. 4,005,505, Cl. 19-150.000.

Robert Bosch G.m.b.H.: *See—*
Stumpp, Gerhard, 4,005,691.

Roberts, Danvern R., to Chagra, Lee A., a part interest. Corona discharge detection system for detecting the presence of any corona discharge in an electrical system. 4,006,410, Cl. 324-52.000.

Robinson, Ian George, to Blythe Colours (Australia) Proprietary Ltd. Oxidation enhancing-vitreous enamel coating on metal substrate and composition therefor. 4,006,279, Cl. 428-432.000.

Robinson, Marion M., to Kanematsu-Gosho (U.S.A.), Inc. Gun trigger mechanism. 4,005,540, Cl. 42-69.00R.

Robinson, Marquis B.: *See—*
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Robinson, Stephen Perrin: *See—*
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Robotham, William Frederick; and Annis, Larry D., to McGraw-Edison Company. Safety switch for power tool. 4,006,334, Cl. 200-157.000.

Rockwell International Corporation: *See—*
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George, Peter K., 4,006,276.
Roczynski, Chester P.: *See—*
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Roczynski, Joseph P.; and Roczynski, Chester P., to Valley Metallurgical Processing Co., Inc. Record producing apparatus. 4,005,965, Cl. 425-315.000.
Rodicker, Joachim, to Volkswagenwerk Aktiengesellschaft. Inductively operated sensor for testing technological quantities of a ferromagnetic work piece. 4,006,406, Cl. 324-34.00R.
Roe, Norman P.; and Brown, Gordon W., to Consolidated Products Corporation. Electromechanical cable deployable in a no-torque condition, and method. 4,006,289, Cl. 174-102.00R.
Rogers, Edward F.; Hannah, John; and Dybas, Richard A., to Merck & Co., Inc. Heterocyclic substituted pyrimidine compounds. 4,006,143, Cl. 260-256.40N.
Rohr Industries, Inc.: *See—*
Mutch, Henry, 4,005,836.
Ross, James A., 4,006,373.
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Rolls-Royce (1971) Limited: *See—*
Newman, Paul, 4,005,914.
Scott, Alexander; and Peck, Peter Eric, 4,005,575.
Rombach, James L.; and Strebel, David W. Rodent exterminator. 4,005,976, Cl. 431-13.000.
Romeas, Rene: *See—*
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Romney, Russell H. Changeable display apparatus. 4,006,476, Cl. 340-373.000.
Rose, Robert K.: *See—*
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Rosen, Arnold; and Harris, William Harvey. Vibratory massage therapeutic device. 4,005,703, Cl. 128-33.000.
Rosenberg, Jeffrey P. Pool cleaning device. 4,005,723, Cl. 134-167.00R.
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Ross, James A., to Rohr Industries, Inc. Staggered motor core. 4,006,373, Cl. 310-13.000.
Roth, Abraham H.; and Roth, Dave, to Roth Bros. Inc. Roof expansion joint. 4,005,555, Cl. 52-60.000.
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Roth, Dave: *See—*
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Rothman, Barry, deceased (Rothman, Shirley, administratrix), to Jacobs, Morton C., a part interest. Pyrotechnic noisemaker. 4,005,657, Cl. 102-37.000.
Rothman, Shirley, administratrix: *See—*
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Rothmans of Pall Mall Canada Limited: *See—*
Brackmann, Warren A.; and Dilanni, Daniel, 4,005,717.
Rougeaux, Claude Maurice: *See—*
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Rowlands, Kenneth Charles: *See—*
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Royston, Mark William, to Pacific Pneumatics, Inc. Monitoring apparatus for a pneumatic conveyor system. 4,006,349, Cl. 235-151.340.
Rubenstein, Leonard; and Robinson, Stephen Perrin. Sound recording and reproducing machines. 4,006,312, Cl. 179-6.00R.
Rubin, Alan M., to Glass, John P. Card comparing apparatus. 4,006,341, Cl. 235-61.70R.
Ruf, Max, to Audi NSU Auto Union Aktiengesellschaft. Piston of a rotary piston engine of trochoid type, having an internal seal. 4,005,953, Cl. 418-142.000.
Russo, Anthony J.: *See—*
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Saito, Masaaki: *See—*
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Sakaguchi, Kahei; Minakata, Masaaki; Yamashita, Kazutaka; and Sugimoto, Fumiko, to Kao Soap Co., Ltd. Process for preparation of glass fiber mats. 4,006,272, Cl. 428-268.000.
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Sakai, Masao: *See—*
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Salkin, Burton, to Baxter Laboratories, Inc. Snap-lock button-type fluid connector with recess. 4,006,088, Cl. 210-321.00B.
Salmond, William G., to Upjohn Company, The. Process for 7-keto-Δ^5-steroids. 4,006,172, Cl. 260-397.200.
Salzer, Martin: *See—*
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Samuel Moore and Company: *See—*
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Samuel Pegg & Son Limited: *See—*
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Samuelson, Harry Vaughn; and Singh, Gurdial, to Du Pont de Nemours, E. I., and Company. Conductive aliphatic polyester or polyetherester having units containing phosphonium sulfonate groups. 4,006,123, Cl. 260-75.00P.
Sanborn, Lawrence F.: *See—*
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Sanford, Arthur Carol. Frame structure fabricating system. 4,005,520, Cl. 29-432.000.
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Sankyo Company Limited: *See—*
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Sankyo Electric Co., Ltd.: *See—*
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Sano, Fukuzi: *See—*
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Sano, Konosuke; Matsuda, Keizo; Mitsugi, Koji; Yamada, Kazuhiko; Tamura, Fumihide; Yasuda, Naohiko; and Noda, Ichiro, to Ajinomoto Co., Inc. Method of producing L-cysteine and L-cystine. 4,006,057, Cl. 195-29.000.
Sarre, Olga: *See—*
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Sasaguri, Kyoji: *See—*
Miyashita, Tsuneo; Sano, Kazuo; Sasaguri, Kyoji; Ishihara, Kazuo; and Hironaka, Shunichi, 4,005,986.
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Sassa, Augustus J.: *See—*
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Sato, Fusamatsu, to Fujiki Denki Kabushiki Kaisha. Automatic closure valve for water sprinkler. 4,005,725, Cl. 137-112.000.
Sato, Yoichi, to Nippon Electric Company, Ltd. Equalizer comprising first and second equalizing means and trainable in two steps. 4,006,352, Cl. 235-152.000.
Savich, Peter P., to Scott Paper Company. Apparatus for forming fibrous pads. 4,005,957, Cl. 425-80.000.
Savins, Joseph George, to Mobil Oil Corporation. Biopolymer production process. 4,006,058, Cl. 195-49.000.
Schaefer, Louis F., to Sharp Corporation. Information recording and reproducing system with plural information tracks within a single groove. 4,006,292, Cl. 358-128.000.
Schalude, Willi: *See—*
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Scharpenberg, Hans-Georg: *See—*
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Schirtzinger, Joseph F., to Sea-Log Corporation. Fluid vacuum release for ice cutting systems. 4,005,666, Cl. 114-42.000.
Schittko, Johannes, to Siemens Aktiengesellschaft. Calibratable heterodyne receiver. 4,006,420, Cl. 325-363.000.
Schlage Lock Company: *See—*
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Schlatter, Gerald L.; and Miller, Charles E., to International Telephone and Telegraph Corporation. Fluid property detection system. 4,005,599, Cl. 73-59.000.
Schlossberg, Howard R., to United States of America, Air Force. Gaseous infrared waveguide mixer. 4,006,363, Cl. 307-88.300.
Schlosser, Donald K.: *See—*
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Schmelow, Harald Martin: *See—*
Weman, Per Olof; and Schmelow, Harald Martin, 4,005,904.
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Schmidt, Robert Rudolf: *See—*
Jager, Gerhard; Wenzelburger, Jurgen; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,006,008.
Schmitmeyer, Steven H.; and Strayer, James W., to United States of America, Air Force. Traction sheave warning for helicopter rescue hoist systems. 4,005,852, Cl. 254-173.00R.
Schneider, Clayton J., Jr.; Washburn, Harold A.; and Blickenstaff, John E., to Calspan Corporation. Impact actuated projectile fuze. 4,005,659, Cl. 102-72.000.
Schneiter, Fred E.: *See—*
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Schrenk, Walter J.: *See—*
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Schriber, Stanley O., to Atomic Energy of Canada Limited. X-ray beam flattener. 4,006,361, Cl. 250-510.000.
Schriber, Stanley O., to Atomic Energy of Canada Limited. Double pass linear accelerator operating in a standing wave mode. 4,006,422, Cl. 328-233.000.
Schrider, Michael Stanley, to American Cyanamid Company. Substituted octahydrophenanthridine pesticides. 4,006,236, Cl. 424-258.000.
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Schurman, Peter T., to Plastic Forming Company, Inc., The. Plastic container hinge and latch. 4,005,800, Cl. 220-337.000.
Schutte, George F. Mechanical binary number adding and subtracting apparatus. 4,006,344, Cl. 235-68.000.
Schwend, Fred N.: *See—*
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Scisson, Sidney E.: *See—*
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SCM Corporation: *See—*
Cappotto, Samuel D.; and Dodge, John E., 4,005,771.
Scott, Alexander; and Peck, Peter Eric, to Rolls-Royce (1971) Limited. Differentially geared reversible fan for ducted fan gas turbine engines. 4,005,575, Cl. 60-226.00R.
Scott, Hollis C., to Western Wood Structures, Inc. Dome joint. 4,005,561, Cl. 52-260.000.
Scott Paper Company: *See—*
Savich, Peter P., 4,005,957.
Scott, Patricia M.: *See—*
Butler, John R.; and Scott, Patricia M., 4,006,382.
Sea-Log Corporation: *See—*
Schirtzinger, Joseph F., 4,005,666.
Sebesta, George J.; Hofer, Alan; and Carlisle, Richard W., to Dyna Magnetic Devices, Inc. Inertial microphone system. 4,006,318, Cl. 179-121.00C.
Seeley, Leonard, to Plastofilm Industries, Inc. Package for oral thermometer, catheter or the like. 4,005,776, Cl. 206-306.000.
Seferian, Rupen B.; Kaprielian, Roy M.; and Michaelson, Joseph B., to Seferian, Rupen B.; and Kaprielian, Roy M. Phosphate enriched peat moss fertilizer and method therefor including free amino acid supplementation. 4,006,004, Cl. 71-11.000.
Seferian, Rupen B.; Kaprielian, Roy M.; and Michaelson, Joseph B., to Seferian, Rupen B.; and Kaprielian, Roy M. Phosphate enriched manure fertilizer and method therefor including free amino acid supplementation. 4,006,005, Cl. 71-11.000.
Segsworth, Robert Sidney; and Alcock, Charles Benjamin, to Tibur Metals, Ltd. Extended arc furnace and process for melting particulate charge therein. 4,006,284, Cl. 13-9.00R.
Seidling, Eugene H.: *See—*
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Sekikawa, Nobuyoshi: *See—*
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Sell, Darrell Dean, to Bell Telephone Laboratories, Incorporated. Apparatus for word synchronization in an optical communication system. 4,006,304, Cl. 178-69.100.
Selsam, Roger L.: *See—*
Bouyoucos, John V.; Selsam, Roger L.; and Courtright, Dennis R., 4,005,637.
Seo, Ryozo: *See—*
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Shemitz, Sylvan R.; and Stahlheber, Benjamin L., to Sylvan R. Shemitz and Associates, Inc. Luminaire. 4,006,355, Cl. 240-51.11R.
Shenoy, Umakant Devdas, to DDSA Pharmaceuticals. Hydroxymethyl benzodiazepine derivatives. 4,006,135, Cl. 260-239.0BD.
Shepard, Kenneth L.; and Paleveda, William J., Jr., to Merck & Co., Inc. N-(pyrimidinyl)-tricyclo[3(or 4).2.2.0$^{2,6 \text{ or } 3}$]-non (or dec-)enedicarboximides. 4,006,233, Cl. 424-251.000.
Shimizu, Shigemi: *See—*
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Shimotake, Hiroshi; Bartholme, Louis G.; and Arntzen, John D., to United States of America, Energy Research and Development Administration. Method of preparing an electrochemical cell in uncharged state. 4,006,034, Cl. 29-623.100.
Shin-Shirasuna Electric Corporation: *See—*
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Shiraishi, Takeichi: *See—*
Matsuura, Kazuo; Kuroda, Nobuyuki; Shiraishi, Takeichi; and Miyoshi, Mitsuji, 4,006,101.
Short, Douglas Paviour; Gillon, Donald James; and Milsom, Henry Britton Coates, to Fisher & Paykel Limited. Splints. 4,005,705, Cl. 128-87.00R.
Showa Manufacturing Co., Ltd.: *See—*
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Shroot, Braham: *See—*
Cox, David A.; and Shroot, Braham, 4,006,230.
Shuck, Lowell Z., to United States of America, Energy Research and Development Administration. Method for selectively orienting induced fractures in subterranean earth formations. 4,005,750, Cl. 166-308.000.
Shuler, James Richard: *See—*
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Siegle, Peter; Kuhle, Engelbert; Zumach, Gerhard; Hammann, Ingeborg; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. Benzo-1,3-dioxolan-4-yl N-methyl-N-phenylmercapto-carbamates. 4,006,244, Cl. 424-282.000.
Siemens Aktiengesellschaft: *See—*
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Reisinger, Konrad, 4,006,302.
Ross, Dieter, 4,006,431.
Schittko, Johannes, 4,006,420.
Sigel, Pierre Louis; and Kurzweil, Karel Gaston, to Societe Honeywell Bull (Societe Anonyme). Apparatus for orienting patterns provided on masks for serigraphy. 4,005,651, Cl. 101-127.100.

Sigmatex, A.G.: *See—*
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Silberberg, Jeffrey L., to United States of America, Health, Education and Welfare. Field instrument for measurement of AC voltage fluctuations. 4,006,413, Cl. 324-103.00P.
Silverstein, Seth D.; and Prener, Jerome S., to General Electric Company. Optical coating with selectable transmittance characteristics and method of making the same. 4,006,378, Cl. 313-112.000.
Simington, Donald L. Bridle bit. 4,005,564, Cl. 54-8.000.
Simmons, Todd S.: *See—*
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Simmons, William S.: *See—*
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Simonsen, Harald; Specht, Hans; Baumgartel, Klaus; and Meumann, Hans, to Continental Gummi-Werke Aktiengesellschaft. Conveyor belt. 4,005,610, Cl. 74-237.000.
Simpson, Harold A.; and Thompson, Edwin C., to Bell Telephone Laboratories, Incorporated; and Western Electric Company, Inc. Frequency filter. 4,006,437, Cl. 333-72.000.
Simpson, Herbert John; and Heller, Walter, to Preformed Line Products Company. Reinforced concrete appliance. 4,005,560, Cl. 52-677.000.
Simpson Manufacturing Co., Inc.: *See—*
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Singer Company, The: *See—*
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Greenwood, Ivan A.; and Bayley, Donald S., 4,006,405.
Singer, Rolf-Jurgen: *See—*
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Singh, Gurdial: *See—*
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Sipos, Tibor, to Johnson & Johnson. Potentiated medicaments. 4,006,218, Cl. 424-54.000.
Slavin, Michael; Bata, George T.; Emery, Raymen F.; and Ludwig, George C., to Bendix Corporation, The. Thermomechanical vacuum regulator using bimetallic position sensing. 4,005,821, Cl. 236-87.000.
Sleep, Craig F., to SI Handling Systems, Inc. Apparatus and method for unloading driverless vehicles. 4,005,787, Cl. 214-58.000.
Slusarchyk, William A.; and Weisenborn, Frank Lee, to E. R. Squibb & Sons, Inc. Derivatives of diumycin A and diumycin A'. 4,006,221, Cl. 424-118.000.
Smale, Charles H., to General Motors Corporation. Recuperative mounting. 4,005,573, Cl. 60-39.320.
Smith Brothers Wood Products Inc.: *See—*
Smith, James; and Van Ryn, Arthur L., 4,005,918.
Smith, David F. Type of adhesive cement and certain improved products made possible thereby. 4,005,706, Cl. 128-90.000.
Smith, Frank R., Jr.: *See—*
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Smith, Harry: *See—*
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Smith, James; and Van Ryn, Arthur L., to Smith Brothers Wood Products Inc. Vertically adjustable sewing machine mounting. 4,005,918, Cl. 312-27.000.
Smith, Joel E., to Smith, Joel E. Fish claw. 4,005,897, Cl. 294-115.000.
Smith, Leroy H., Jr., to United States of America, National Aeronautics and Space Administration. Reverse pitch fan with divided splitter. 4,005,574, Cl. 60-226.00A.
Smith, Richard A.; and Haney, Thomas E., to General Foods Corporation. Instant pudding composition and process. 4,006,262, Cl. 426-573.000.
Smith, Robert K.: *See—*
Guile, Donald L.; and Smith, Robert K., 4,006,029.
Smith, Robert L., to Kasle Steel Corporation. Ram for lift truck. 4,005,793, Cl. 214-620.000.
Smith, William, to Steel Company of Canada, Limited, The. Mandrelless downcoiler for coil box. 4,005,830, Cl. 242-78.100.
SmithKline Corporation: *See—*
Anderson, Elvin L.; Lam, Bing L.; and Wellman, George R., 4,006,169.
Snam Progetti S.p.A.: *See—*
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Societe Anonyme dite Automobiles Peugeot: *See—*
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Societe Anonyme Francaise du Ferodo: *See—*
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Societe Honeywell Bull (Societe Anonyme): *See—*
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Societe Internationale de Mecanique Industrielle, S.A.: *See—*
Mincuzzi, Antonio, 4,006,402.
Societe Soberal S.A.: *See—*
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Societe Suisse pour l'Industrie Horlogere Management Services S.A.: *See—*
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Sodomann, Heinrich; Hauschulz, Bruno; and Althoff, Gunther, to Phenolchemie GmbH. Process for the preparation of aralkyl monohydroperoxides. 4,006,191, Cl. 260-610.00B.
Soles, Otto H.: *See—*
Crookston, Ronald W.; Alverson, Thomas E.; and Soles, Otto H., 4,006,332.
Sollerud, Soren Elof Mauritz, to Tetra Pak Developpement SA. Apparatus for connecting together parts of foam plastics. 4,005,975, Cl. 425-500.000.
Solomon, Arthur H.: *See—*
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Soma, Hiroshi: *See—*
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Somlo, Tibor: *See—*
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Sommer, August; and Wessendorf, Richard, to Veba Chemie AG. Process for purifying glyoxal. 4,006,189, Cl. 260-601.00R.
Sommers, Alex, to Bearingwall Systems Inc. Invertible apparatus for molding a concrete panel. 4,005,972, Cl. 425-439.000.
Son, Pyong-Nae, to B. F. Goodrich Company, The. Morpholinothio oxamides. 4,006,140, Cl. 260-246.00B.
Sony Corporation: *See—*
Kuniyoshi, Yasunobu; and Yamagiwa, Kazuo, 4,006,423.
Matsudaira, Takeshi; and Nakamura, Shoichi, 4,006,313.
Onodera, Toshio, 4,006,385.
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Sourbel, Jean-Claude; and Guettier, Michel, to Regie Nationale des Usines Renault; and Societe Anonyme dite Automobiles Peugeot. Variable force reducing pedal control device for pressure emitter. 4,005,617, Cl. 74-516.000.
Southwire Company: *See—*
Cofer, Daniel B.; Chia, Enrique Calixta; Burnitt, John E.; and Kaltenberg, Theodor W., 4,005,744.
Sparwald, Volker, to Vereinigte Aluminum-Werke Aktiengesellschaft; and Metallgesellschaft Aktiengesellschaft, part interest to each. Method of and apparatus for the treatment of exhaust-gases in the electrolytic production of aluminum. 4,006,066, Cl. 204-67.000.
Specht, Hans: *See—*
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Spector, George: *See—*
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Sphero International Co.: *See—*
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Spiegel, Erwin: *See—*
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Srivastava, Oudh Narain Lal: *See—*
Bhuchar, Vishwa Mitra; Agrawal, Arun Kumar; Kiss, Franz; Vasisht, Jayanti Prasad; Parkash, Dharam; and Srivastava, Oudh Narain Lal, 4,006,062.
Staba, Tomo. Watercraft with hydrofoils. 4,005,667, Cl. 114-283.000.
Stach, Kurt: *See—*
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Stagi, Mauro; Somlo, Tibor; and Gaspar, Frantisek, to Ciba-Geigy Corporation. Process for the manufacture of dicyanovinyl compounds. 4,006,178, Cl. 260-465.00D.
Stahlheber, Benjamin L.: *See—*
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Standard Oil Company: *See—*
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Standard Oil Company (Indiana): *See—*
Bateman, Allen H.; Case, Charles B.; Kragness, David W.; and LeDuc, Edward C., 4,005,626.
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Meguerian, Garbis H.; Hirschberg, Eugene H.; and Rakowsky, Frederick W., 4,006,103.
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Stapley, Edward O.: *See—*
Kahan, Jean S.; Kahan, Frederick M.; Stapley, Edward O.; Goegelman, Robert T.; and Hernandez, Sebastian, 4,006,060.
Starr, Frank; and Starr, Jean. Patient lifting device. 4,005,498, Cl. 5-81.00R.
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Stauffer Chemical Company: *See—*
Chan, Jimmy H.; and Pitt, Harold M., 4,006,196.

Gutman, Arnold D., 4,006,154.
Stavalone, Lawrence S. Optical comparator for testing printed circuit boards. 4,005,939, Cl. 356-165.000.
Steel Company of Canada, Limited, The: *See—*
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Steelcase, Inc.: *See—*
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Steinke, Alexander: *See—*
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Steinman, Robert J., Jr.; Pruss, John M.; and Joseph, Leonard G., to Cyclops Corporation. Starter plate for electro slag remelting apparatus. 4,006,285, Cl. 13-9.0ES.
Stepien, Henryk K.: *See—*
Gandhi, Haren S.; Shelef, Mordecai; Stepien, Henryk K.; and Yao, Hsin C., 4,006,102.
Sterne, Harold E. Machine for trimming a copy sheet and applying adhesive thereto. 4,005,675, Cl. 118-38.000.
Stevens (Boyer), Elaine. Electric power scrubber. 4,005,502, Cl. 15-22.00R.
Stevens, David R., to Amerace Corporation. High voltage shielded cable termination, splice connection, and method of making a splice connection. 4,006,288, Cl. 174-73.00R.
Stevens, Violete L., to Dow Chemical Company, The. Polymercaptoesters of polyglycidols. 4,006,068, Cl. 204-159.110.
Stewart, Samuel F. Racket weighting means. 4,005,864, Cl. 273-73.00R.
Stickney, Dwight R.; Simmons, William S.; Nichol, Charles A.; Hitchings, George H.; and Elion, Gertrude B., to Burroughs Wellcome Co. Treating CNS lymphoma. 4,006,235, Cl. 424-251.000.
Stiftung fuer Humaniora und Wissenschaft: *See—*
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Stipich, Ante: *See—*
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Stohr, Christoph; and Kerkrath, Klaus. Device for the foot end of a leg cast. 4,005,704, Cl. 128-83.500.
Storey, John Thomas, to Delta Metal Electronics Limited. Welding cable. 4,006,287, Cl. 174-15.0WF.
Stradalen, Yngve Bertil: *See—*
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Stragier, Marcel G.; and Peterson, Theodore J., to Government Innovators. Refuse container. 4,005,791, Cl. 214-302.000.
Strange, Delbert D.; and Hunts, Ronald M., to Manufacturing Approaches & Total Concepts Inc. Automatic dadoing machine. 4,005,738, Cl. 144-136.00R.
Strauch, Karl; and Kammann, Wilfried, to Werner Kammann Maschinenfabrik. Special article screen printer and drive therefor. 4,005,649, Cl. 101-40.000.
Strauts, Eric J.: *See—*
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Strehlke, Peter; Schroeder, Eberhard; and Kessler, Hans-Joachim, to Schering Aktiengesellschaft. Certain halothien-2-yl 5-nitrothiazol-2-yl ketones and fungicidal composition. 4,006,241, Cl. 424-270.000.
Strehlke, Peter; Kessler, Hans-Joachim; and Redmann, Ulrich, to Schering Aktiengesellschaft. Amino-, mercapto- and -oxy-substituted-phenyl and -phenalkyl imidazoles. 4,006,243, Cl. 424-273.000.
Streifer, William; Scifres, Donald R.; and Burnham, Robert D., to Xerox Corporation. Integrated grating output coupler in diode lasers. 4,006,432, Cl. 331-94.50C.
Strobel, Carmon Rue: *See—*
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Studtmann, George Henry, to Borg-Warner Corporation. Induction generator excitation system. 4,006,399, Cl. 322-47.000.
Stumpp, Gerhard, to Robert Bosch G.m.b.H. Control installation for exhaust gas recycling. 4,005,691, Cl. 123-119.00A.
Subramanian, Kohur Nagaraja: *See—*
Hall, Rotrou Alan; Jones, William Edward; and Subramanian, Kohur Nagaraja, 4,006,215.
Sudre, Jean-Louis, to Etablissements Carpano & Pons S.A. Multiple connector. 4,005,925, Cl. 339-198.00H.
Suga, Shigeru. Carbon electrodes for an ultraviolet arc lamp for use in a light-fastness tester. 4,006,379, Cl. 313-352.000.
Suga, Shigeru. Mounting of carbon electrodes on a holder of an arc lamp. 4,006,380, Cl. 313-357.000.
Sugawara, Shinichi: *See—*
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Sugimoto, Fumiko: *See—*
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Sugisaki, Takao; Ochiai, Tatsushiro; Nishikawa, Kyoichi; and Higurashi, Minoru, to TDK Electronics Company, Limited. Magnetic material detecting device. 4,006,408, Cl. 324-41.000.
Sugiura, Masatoshi: *See—*
Nohira, Hidetaka; and Sugiura, Masatoshi, 4,005,692.
Sugiyama, Takayasu: *See—*
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Sullins, James R.; and West, Robert E., to ABS Worldwide Technical Services, Inc. Pipeline crawler. 4,006,359, Cl. 250-358.00P.
Sullivan, Alfred Bay, to Monsanto Company. Method for preparation of phosphorus polysulfides. 4,006,155, Cl. 260-306.500.
Sulzer Brothers Limited: *See—*
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Sumi, Momoki, to Sumi, Momoki; and Hishikawa, Shunichi. Information detector for a tire wheel. 4,006,449, Cl. 340-58.000.
Sumitomo Durez Company, Ltd.: *See—*
Nakamura, Nobutaka; and Saeki, Yukio, 4,006,081.
Sundt, Cornelius V., to United Technologies Corporation. Method of manufacturing a closed channel disk for a gas turbine engine. 4,005,515, Cl. 29-156.80R.
Suter, Max, to Societe Suisse pour l'Industrie Horlogere Management Services S.A. Touch pad arrangement for signalling arrivals in swimming competitions. 4,006,364, Cl. 307-119.000.
Sutter, Erhard, to Hermann Lanz AG, Switzerland. Supporting plate arrangement. 4,005,497, Cl. 5-68.000.
Suzuki, Isao: *See—*
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Suzuoki, Kazuhiro: *See—*
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Svenska Rotor Maskiner Aktiebolag: *See—*
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Swank, Thomas F.; and Waack, Richard, to Polaroid Corporation. Process for dispersing sensitizing dyes. 4,006,025, Cl. 96-129.000.
Swearingen, Judson S. Seal system and method. 4,005,580, Cl. 60-657.000.
Swinkels, Dominicus Adrianus Johannes, to Broken Hill Proprietary Company Limited, The. Rotary vane engine with orbiting inner and outer members. 4,005,951, Cl. 418-61.00R.
Swiss Aluminium Ltd.: *See—*
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Sylvan R. Shemitz and Associates, Inc.: *See—*
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Syntex Puerto Rico, Inc.: *See—*
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Syntex (U.S.A.) Inc.: *See—*
Berger, Kenneth L.; Amen, Ronald J.; Nassar, Jorge J.; and Benken, William B., 4,006,253.
Szabo, Tibor, to Szabo, Tibor. Mold-closing unit, particularly for injection-molding machines. 4,005,974, Cl. 425-450.100.
Szuszczewicz, Edward P.; and Holmes, Julian C., to United States of America, Navy. Pulsed plasma probe. 4,006,404, Cl. 324-33.000.
Tachibana, Hiroshi: *See—*
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Taguchi, Seiichi: *See—*
Ohtsuka, Shuichi; Taguchi, Seiichi; and Honjo, Satoru, 4,006,022.
Tait, William, to Lawrence Peska Associates, Inc., a part interest. Training device for ice skaters. 4,005,859, Cl. 272-70.300.
Takahashi, Bunzo; Tachibana, Hiroshi; and Otake, Minoru, to Fuji Photo Film Co., Ltd. Audio-visual training device with selective branching. 4,005,530, Cl. 35-8.00A.
Takahashi, Nobuyuki: *See—*
Nishihara, Toshiro; Takahashi, Nobuyuki; Katoh, Hiroshi; and Ishimaru, Touru, 4,005,665.
Takayasu, Kiyoteru. Device for eliminating impure ions in chromium plating bath. 4,006,072, Cl. 204-238.000.
Takeda, Yosiaki: *See—*
Kawai, Noriaki; Okamoto, Hisaji; Takeda, Yosiaki; Sano, Fukuzi; Kakiuchi, Akio; Manabe, Masami; Nomura, Takashi; and Abe, Sigeya, 4,005,688.
Takeuchi, Hiroo, to Nisshin Kogyo Kabushiki Kaisha. Vacuum-suspended tire servo-motor. 4,005,638, Cl. 91-369.00B.
Takita, Hitoshi: *See—*
Enomoto, Satoru; Takita, Hitoshi; Yanaka, Mikiro; Mukaida, Yutaka; and Wada, Hisayuki, 4,006,192.
Talbot, Daniel B., to Jerrold Electronics Corporation. Homodyne automatic frequency control circuit. 4,006,429, Cl. 331-14.000.
Tamai, Yasukatsu; Nishiyama, Yoshiyuki; and Mitida, Minoru, to Tohoku University. Process for producing a gaseous product from carbonaceous material. 4,005,995, Cl. 48-197.00R.
Tamaro, George John, to ICOS Corporation of America. Method of constructing underground concrete walls and reinforcement cage therefor. 4,005,582, Cl. 61-35.000.
Tamas, Karoly; and Woller, Laszlo, to Mezogazdasagi Foiskola. Process for detoxifying crops, particularly corn, infected by fusarium. 4,006,265, Cl. 426-623.000.
Tamkovich, Oleg Antonovich: *See—*
Adelson, Jury Abramovich; and Tamkovich, Oleg Antonovich, 4,005,786.

Tamura, Fumihide: *See—*
Sano, Konosuke; Matsuda, Keizo; Mitsugi, Koji; Yamada, Kazuhiko; Tamura, Fumihide; Yasuda, Naohiko; and Noda, Ichiro, 4,006,057.

Tanaka, Kiyoshi: *See—*
Oya, Tatsuo; Motoyoshi, Minoru; Okamoto, Masfumi; Tanaka, Kiyoshi; and Sugiyama, Takayasu, 4,006,044.

Tanaka, Masaaki: *See—*
Izura, Yoshiteru; Tanaka, Masaaki; and Sasaki, Seishi, 4,006,343.

Tanzi, Paul J.: *See—*
Liskov, Nathan A.; Bickford, William J.; and Tanzi, Paul J., 4,006,418.

Tappan Company, The: *See—*
Perl, Richard L., 4,005,697.

Tash, George. Article gripping tongs. 4,005,893, Cl. 294-28.000.

Tavolini, Marino Antonio: *See—*
Luppi, Carlos Enrique; Tavolini, Marino Antonio; and Travaini, Juan Carlos Roberto, 4,005,845.

Taylor, Keith Alan, to Tektronix, Inc. Current generator including a rate discriminator. 4,006,369, Cl. 307-261.000.

Taylor, Ray D.; and Krueger, Robert A., to B. F. Goodrich Company, The. Bactericidal and fungicidal composition containing thiocarbanyl sulfenamides. 4,006,251, Cl. 424-328.000.

TDK Electronics Company, Limited: *See—*
Sugisaki, Takao; Ochiai, Tatsushiro; Nishikawa, Kyoichi; and Higurashi, Minoru, 4,006,408.

Tekade Felten & Guilleaume Fernmeldeanlagen GmbH: *See—*
Markl, Georg, 4,006,320.

Tektronix, Inc.: *See—*
Taylor, Keith Alan, 4,006,369.

Teldix GmbH: *See—*
Leiber, Heinz; and Weber, Werner, 4,005,910.

Teloh, David W.: *See—*
Wolinski, Leon E.; Endress, Arthur R.; and Teloh, David W., 4,006,273.

Tenneco Chemicals, Inc.: *See—*
Wang, Wu Lan, 4,006,052.

Termin, Erich; Lenz, Arnold; and Bleh, Otto, to Dynamit Nobel Aktiengesellschaft. Porous silicic acid and its production. 4,006,175, Cl. 260-438.50R.

Terzian, Rouben T.; Friederich, Eckehard; and Morrison, Howard J., to Marvin Glass & Associates. Governor means for toy and game motors or the like. 4,005,764, Cl. 185-37.000.

Tesei, Renato; Fattore, Vittorio; and Buonomo, Franco, to Snam Progetti, S.p.A. Method for the preparation of tertiary olefins. 4,006,198, Cl. 260-682.000.

Tetra Pak Developpement SA: *See—*
Sollerud, Soren Elof Mauritz, 4,005,975.

Texaco Inc.: *See—*
Crouch, William B., 4,006,100.
Marion, Charles P.; and Crouch, William B., 4,006,099.

Texas Instruments Incorporated: *See—*
Hamilton, Stephen P., 4,006,455.
Jones, James J., 4,005,909.
Kmetz, Allan Robert; and Creagh, Linda Truitt, 4,005,928.
Sanford, Carlton E., 4,006,335.

Th. Kieserling & Albrecht: *See—*
Goeke, Alfons; and Riedel, Franz, 4,005,624.

Thall, Earle Solomon, to RCA Corporation. CRT with thermally-set getter spring. 4,006,381, Cl. 313-481.000.

Thayer, Edward B., to United Technologies Corporation. Flap-type two-dimensional nozzle having a plug. 4,005,823, Cl. 239-265.370.

Themelis, Nickolas John; and McKerrow, George Clement, to Noranda Mines Limited. Process for continuous smelting and converting of copper concentrates. 4,005,856, Cl. 266-161.000.

Theodore, Ares N.: *See—*
Labana, Santokh S.; and Theodore, Ares N., 4,006,200.

Thiokol Corporation: *See—*
Jorgensen, Howard E.; Kirchoff, George F.; and Schneiter, Fred E., 4,005,876.

Thomas, Alfred William, to Deutsche Bendix Ausrustungs GmbH. Power boost mechanism. 4,005,640, Cl. 91-460.000.

Thomas, Richard L.: *See—*
Myers, Walter I.; Goodbary, Edgar R.; Thomas, Richard L.; Lewis, Billy W.; and Bartley, Francis A., 4,005,850.

Thompson, Edwin C.: *See—*
Simpson, Harold A.; and Thompson, Edwin C., 4,006,437.

Thomson-Brandt: *See—*
Oprandi, Pierre; and Romeas, Rene, 4,006,295.

Thomson-CSF: *See—*
Moutou, Paul-Cyril; and Godart, Jean-Jacques, 4,006,490.
Narbaits-Jaureguy, Jean-Raymond; and Billottet, Henri, 4,006,447.

Thomson Industries, Inc.: *See—*
Thomson, John B., Jr., 4,005,913.

Thomson, John B., Jr., to Thomson Industries, Inc. Linear motion bearing block. 4,005,913, Cl. 308-6.00C.

Thorp, Ralph E., to Globe Valve Corporation. Faucet valve. 4,005,728, Cl. 137-270.000.

Throssell, Michael Gordon: *See—*
Neale, Denis Manktelow; and Throssell, Michael Gordon, 4,005,926

Tibur Metals, Ltd.: *See—*
Segsworth, Robert Sidney; and Alcock, Charles Benjamin, 4,006,284.

Tiedtke, Karl: *See—*
Linden, Gerhard; Lay, Dierk; and Tiedtke, Karl, 4,005,754.

Timms, Richard H., to Rohr Industries, Inc. Fan duct thrust reverser. 4,005,822, Cl. 239-265.310.

Timpa, Judy D.: *See—*
Chance, Leon H.; Timpa, Judy D.; and Drake, George L., Jr., 4,006,274.

Tioxide Group Limited: *See—*
Twist, Walter; and Spurgeon, Peter, 4,006,080.

Tirpak, Michael R.; Schouten, James J.; and Green, Charles E., to Richardson Company, The. Mineral filled, high impact, polyolefin molding compositions. 4,006,037, Cl. 429-176.000.

Toba, Hirotaka; Ohata, Keiichi; and Tsukane, Nagayoshi, to Daicel, Ltd. Process for manufacturing elastic hard fibers. 4,006,208, Cl. 264-176.00F.

Tobin, John H.; and Wojtowicz, John A., to Olin Corporation. 5-Substituted-2-fluoroanilines. 4,006,185, Cl. 260-575.000.

Todisco, Joseph G.: *See—*
Di Maio, Anthony E.; and Todisco, Joseph G., 4,005,519.

Tohoku University: *See—*
Tamai, Yasukatsu; Nishiyama, Yoshiyuki; and Mitida, Minoru, 4,005,995.

Tokyo Denryoku Kabushiki Kaisha: *See—*
Ochiai, Tomoyoshi; Hayashi, Takeshi; and Furuse, Mituhiro, 4,006,348.

Tomasic, Nicholas A.: *See—*
Wien, Raymond E.; Seidling, Eugene H.; and Tomasic, Nicholas A., 4,006,439.

Tomcufcik, Andrew Stephen: *See—*
Child, Ralph Grassing; Wilkinson, Raymond George; and Tomcufcik, Andrew Stephen, 4,006,234.

Tomczak, Kenneth R. Pocket-billiard trick shot racking device. 4,005,861, Cl. 273-22.000.

Tominaga, Anri: *See—*
Isa, Hiroshi; Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Yamashita, Tatsuji, 4,006,199.

Tortorici, Domenic P.; and Dreznes, John J., to United Filtration Corporation. All dry air cleaner. 4,006,000, Cl. 55-323.000.

Townsend, Loren R. Brake means for an air-powered sprinkler system. 4,005,729, Cl. 137-344.000.

Townsend, Loren R. Brake means for an air-powered sprinkler system. 4,005,730, Cl. 137-344.000.

Townsend, Loren R. Reversible self-propelled center pivot sprinkler system. 4,005,731, Cl. 137-344.000.

Toyo Kogyo Co., Ltd.: *See—*
Uebayasi, Yositaka; Kumon, Hiroshi; Yamada, Michinobu; and Oe, Yoshikazu, 4,005,991.

Toyomoto, Kazuo: *See—*
Ibata, Jyoji; Kobayashi, Hidehiko; Toyomoto, Kazuo; Suzuoki, Kazuhiro; Hayashi, Yoshio; and Kurihara, Masakazu, 4,006,024.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Arai, Hiroshi; and Ohta, Jun, 4,006,448.
Habu, Nobuo, 4,005,684.
Hirai, Akiyoshi; and Uemura, Hiroshi, 4,005,796.
Kawai, Noriaki; Okamoto, Hisaji; Takeda, Yosiaki; Sano, Fukuzi; Kakiuchi, Akio; Manabe, Masami; Nomura, Takashi; and Abe, Sigeya, 4,005,688.
Nohira, Hidetaka; Bessho, Hironori; and Sakai, Yasuyuki, 4,005,576.
Nohira, Hidetaka; and Sugiura, Masatoshi, 4,005,692.

Tranquillitsky, George V. Method for making a can carrier. 4,005,644, Cl. 93-37.0SP.

Travaini, Juan Carlos Roberto: *See—*
Luppi, Carlos Enrique; Tavolini, Marino Antonio; and Travaini, Juan Carlos Roberto, 4,005,845.

Trendel, Dennis: *See—*
Burton, Lawrence A.; Heuser, Peter; Robinson, Marquis B.; Trendel, Dennis; and Zunft, Donald V., 4,006,440.

Tri-Ordinate Corporation: *See—*
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Triplex Safety Glass Company Limited: *See—*
King, Robert David; and Hiscutt, Robert, 4,006,070.

True Temper Corporation: *See—*
Portz, William E.; and Fileger, Eugene W., 4,005,862.

TRW Inc.: *See—*
Buckner, Spencer P., 4,005,732.
Pravin, Parekh C., 4,006,046.

Tsukane, Nagayoshi: *See—*
Toba, Hirotaka; Ohata, Keiichi; and Tsukane, Nagayoshi, 4,006,208.

Tsunoi, Ikuo, to Kabushiki-Kaisha Kyoei Senpaku Kogyo. Apparatus for removal of oil films from water. 4,006,086, Cl. 210-242.00R.

Tucek, Frank J., to J. I. Case Company. Log grappling apparatus. 4,005,894, Cl. 294-88.000.

Tuff-Ten Corporation: *See—*
Muusse, Jay H., 4,005,511.

Tull Aviation Corporation: *See—*
Coulter, J. Roland; and Fuerherm, Arthur E., 4,006,461.

Tung, Chi Fang, to Minnesota Mining and Manufacturing Company. Internally illuminated retroreflective signs. 4,005,538, Cl. 40-132.00R.

Tuomi, Roger L., to United States of America, Agriculture. Lightweight truss-framed house. 4,005,556, Cl. 52-93.000.

Turnbull, John E., to Hanley Company. Tunnel kiln. 4,005,981, Cl. 432-144.000.

Turner, John W., Jr.; and McLaughlin, Russell A., to Joy Manufacturing Company. Drilling tong. 4,005,621, Cl. 81-57.200.

Twist, Walter; and Spurgeon, Peter, to Tioxide Group Limited. Process

for the treatment of acidic waste liquid containing dissolved salts. 4,006,080, Cl. 210-45.000.
UBE Industries, Ltd.: *See—*
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, 4,006,167.
Uchidoi, Masanori: *See—*
Aizawa, Hiroshi; Iwashita, Tomonori; Fukushima, Tadahide; Iura, Yukio; Uchidoi, Masanori; and Kozuki, Susumu, 4,006,489.
Uebayasi, Yositaka; Kumon, Hiroshi; Yamada, Michinobu; and Oe, Yoshikazu, to Toyo Kogyo Co., Ltd. Metal made of steel plate and aluminum material. 4,005,991, Cl. 29-196.200.
Ueda, Kazuo: *See—*
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,005,835.
Ueda, Tetsuo, to Kawasaki Steel Corporation. Apparatus for the continuous casting of metals especially steel, and method of continuously casting metals. 4,005,743, Cl. 164-82.000.
Uehlinger, Hanspeter, to Sandoz Ltd. Anionic diasazo dyes having a 2,2'-dihalodiphenyl tetrazo component radical. 4,006,131, Cl. 260-181.000.
Uemura, Hiroshi: *See—*
Hirai, Akiyoshi; and Uemura, Hiroshi, 4,005,796.
Uemura, Makoto: *See—*
Gerstine, Milton I.; Goldberg, Joshua I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,005,835.
Ueno, Makoto: *See—*
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Uhlir, Pavel, to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi. Knitting elements. 4,005,589, Cl. 66-95.000.
Ukigai, Toshiyuki: *See—*
Isa, Hiroshi; Mandai, Hiroshi; Ukigai, Toshiyuki; Tominaga, Anri; and Yamashita, Tatsuji, 4,006,199.
Umemura, Sumio; Ohdan, Kyoji; Sakai, Fumihiko; Bando, Yasuo; and Ikezawa, Harumi, to UBE Industries, Ltd. Vapor phase oxidation of unsaturated aliphatic hydrocarbon to maleic anhydride using a catalyst consisting essentially of the oxides of vanadium, phosphorous, zirconium, and manganese. 4,006,167, Cl. 260-346.80A.
Union Oil Company of California: *See—*
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Uniroyal A.G.: *See—*
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United Filtration Corporation: *See—*
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United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of The: *See—*
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Agriculture: *See—*
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Tuomi, Roger L., 4,005,556.
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LaCombe, Donald J., 4,006,479.
Schlossberg, Howard R., 4,006,363.
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White, James K., 4,006,446.
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Everett, Seth Leroy, Jr., 4,005,931.
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Foner, Simon; McNiff, Edward J., Jr.; and Alexander, Edwin J., 4,006,107.
Kaplan, Samuel; Chertock, Alan J.; and Punches, James R., 4,005,521.
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Shuck, Lowell Z., 4,005,750.
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Silberberg, Jeffrey L., 4,006,413.
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Smith, Leroy H., Jr., 4,005,574.
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Brickerd, Millard S., Jr., 4,006,309.
Campbell, Kenneth J.; and Mogle, Douglas H., 4,006,412.
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Holtrop, John W., 4,005,632.
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United Technologies Corporation: *See—*
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Lippincott, Leander H., deceased, 4,005,612.
Paulonis, Daniel Francis; Duvall, David Scott; and Sikorowicz, Gerard Casimer, 4,005,988.
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Sundt, Cornelius V., 4,005,515.
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University of Alabama: *See—*
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Black, Allan Lindsay; and Fukuto, Tetsuo Roy, 4,006,231.
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Unverferth Manufacturing Company, Inc.: *See—*
Bonomo, Melvin E., 4,005,907.
UOP Inc.: *See—*
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Upham, John S.; Grybek, R. Scott; and Raulerson, Theodore R., Jr., to Ceres Pharmacal Company. Composition and method for countering effects of alcohol consumption. 4,006,219, Cl. 424-94.000.
Upjohn Company, The: *See—*
Chen, Augustin T.; and Farrissey, William J., Jr., 4,006,122.
Moon, Malcolm W., 4,006,132.
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Juganson, Elmar Juganovich; Chernyavsky, Isaak Yakovlevich; Ivantsov, Vladimir Yakovlevich; Blinov, Jury Ivanovich; Ustyantsev, Vladimir Petrovich; and Klestov, Igor Alexeevich, 4,005,741.
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Vaessen, Hubert J., to H. Vaessen B.V. Process for producing sausage casings. 4,006,258, Cl. 426-272.000.
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Valencia, Flavio A.: *See—*
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Valley Metallurgical Processing Co., Inc.: *See—*
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Vander Kamp, Steven Douglas: *See—*
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van Leer, Willem, to Hydrophilics International, Inc. Method and device for the assessment of signatures for forgeries. 4,005,878, Cl. 283-8.00R.
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Vaughn, Jesse Glispin; and Vander Kamp, Steven Douglas, to Babcock & Wilcox Company, The. Optical viewing, photographic device for vapor generator. 4,006,486, Cl. 354-76.000.
Vaughn, Kennith E.: *See—*
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Villasenor de Rivas, Eduardo, to Villasenor de Rivas, Rene. Electromagnetic generator. 4,006,401, Cl. 323-92.000.

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Villo, Jean, co-executrix: *See—*
Villo, Joseph P., deceased; Villo, Jean, co-executrix; Fidelity Bank, co-executor, The; and Wilson, Charles A., 4,005,740.

Villo, Joseph P., deceased; by Villo, Jean, co-executrix; by Fidelity Bank, co-executor, The; and Wilson, Charles A., to Standard Pressed Steel Co. Rotation resistant nut. 4,005,740, Cl. 151-41.730.

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Wade, Peter C., to E. R. Squibb & Sons, Inc. Use of 2-(hydroxyalkyl)-1H-benz[de]isoquinoline-1,3(2H)-diones as anti-allergy agents. 4,006,238, Cl. 424-258.000.

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Wald, Milton M.: *See—*
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Walker, Paul La Verne; and Strobel, Carmon Rue, to Chrysler Corporation. Battery heat shield and windshield washer reservoir. 4,006,280, Cl. 429-98.000.

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B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
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B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
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B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
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B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
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B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
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B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
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B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
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B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
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B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
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B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
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B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
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B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398 220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976				

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 1ST DAY OF FEBRUARY, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Bell Telephone Laboratories, Incorporated: *See*—
Genaro, Donald Michael; McGarvey, John Niel; Seretny, Stanley Edward; Tilley, Alvin Richard; and Webb, Carl Eugene, T955,001.

Blood, Alden E.: *See*—
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Cavaliere, Joseph Richard; and Eardley, David Barry, to International Business Machines Corporation. Delay circuits using negative resistance CMOS circuits. T955,006, 2-1-77, Cl. 307-251.000.

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Genaro, Donald Michael; McGarvey, John Niel; Seretny, Stanley Edward; Tilley, Alvin Richard; and Webb, Carl Eugene, to Bell Telephone Laboratories, Incorporated. Telephone set. T955,001, 2-1-77, Cl. D26-14.00A.

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Gregor, Lawrence V.; and Shepheard, Robert G., to International Business Machines Corporation. Flip chip structure including a silicon semiconductor element bonded to an Si_3N_4 base substrate. T955,008, 2-1-77, Cl. 357-80.000.

Heggs, Thomas Geoffrey: *See*—
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Imperial Chemical Industries Limited: *See*—
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International Business Machines Corporation: *See*—
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Irvin, Geoffrey Pickles: *See*—
Mann, David Roderick; Irvin, Geoffrey Pickles; and Silverwood, Richard, T955,003.

Lansbury, Robert Clive; and Heggs, Thomas Geoffrey. Film-forming composition. T955,009, 2-1-77, Cl. 428-515.000.

Mann, David Roderick; Irvin, Geoffrey Pickles; and Silverwood, Richard, to Imperial Chemical Industries Limited. Photographic films. T955,003, 2-1-77, Cl. 96-87.00A.

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Milkovic, Miran, to General Electric Company. Method and apparatus for metering apparent energy. T955,007, 2-1-77, Cl. 324-141.000.

Ragonese, Ronald R.; and Schulman, Franklin D., to International Business Machines Corporation. Hardware/software monitoring system. T955,010, 2-1-77, Cl. 444-1.000.

Sayre, Robert K., to Westinghouse Electric Corporation. Method for heat exchanger leak detection in a liquid metal cooled nuclear reactor. T955,004, 2-1-77, Cl. 176-19.00R.

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Schultz, James J.; and Van Pelt, Vincent J., to Tennessee Valley Authority. Fertilizer processes incorporating scrubbed flue gas sludge byproduct. T955,002, 2-1-77, Cl. 71-25.000.

Seretny, Stanley Edward: *See*—
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Silverwood, Richard: *See*—
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Statman, Max: *See*—
Stutler, Athey C.; Statman, Max; and Blood, Alden E., T955,005.

Stutler, Athey C.; Statman, Max; and Blood, Alden E. Process for purification of alkyl methacrylates. T955,005, 2-1-77, Cl. 260-486.00R.

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Tilley, Alvin Richard: *See*—
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Dewulf, Paul Joseph: *See*—
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Duchateau, Georges Francois; and Dewulf, Paul Joseph, to Raffinerie Tirlemontoise. Method of manufacturing elements of crystallized sugar. Re. 29,129, Cl. 127-63.000.

Janssen, Alexander Patton, to Datastrip Corporation. Visible index systems. Re. 29,127, Cl. 40-64.00R.

Lee, Chin K.; and Long, Margaret E., to R. J. Reynolds Tobacco Company. Enzymatic process using immobilized microbial cells. Re. 29,130, Cl. 195-31.00F.

List, Harold A.; and Baker, Jack H., to Bethlehem Steel Corporation. Automatic dry coke weight system. Re. 29,132, Cl. 235-151.100.

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Smith, Oliver Wendell; Weigel, James Edward; and Trecker, David John, to Union Carbide Corporation. Radiation-curable acrylate-capped polycaprolactone compositions. Re. 29,131, Cl. 260-77.5AN.

Sohre, John S. Vaneless supersonic nozzle. Re. 29,128, Cl. 239-289.000.

Trecker, David John: *See*—
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Meilland, Marie-Louise; Meilland, Alain A.; and Richardier, Michele Meilland, to Conard-Pyle Company, The. Rose plant—meilimona variety. 4,013, 2-1-77, Cl. 15.000.

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Adkinson, Joseph E., to Caldwell, Wilfred G. Two-piece provincial style breakfront or the like. 243,221, 2-1-77, Cl. D6-154.000.

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Antone, Lawrence J. Wood burning stove. 243,242, 2-1-77, Cl. D23-93.000.

Appleman, Donald T., to Procter & Gamble Company, The. Sheet of paper toweling. 243,278, 2-1-77, Cl. D59-2.00B.

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Ballantyne, John R., to Superscope, Inc. Loudspeaker grille. 243,253, 2-1-77, Cl. D26-14.00G.

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Bookless, George W.; and Samczyk, Casimir S., to Bell & Howell Company. Reusable microfilm cartridge. 243,279, 2-1-77, Cl. D26-14.00B.

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Breneman, Jack L., to Quaker Oats Company, The. Toy loader. 243,266, 2-1-77, Cl. D34-15.0AJ.

Breneman, Jack L.; and Samson, Jeffrey T., to Quaker Oats Company, The. Toy digger. 243,267, 2-1-77, Cl. D34-15.0AJ.

Brilando, Frank P.; and Schwinn, Rudolph L., to Schwinn Bicycle Company. Bicycle fender reflector. 243,233, 2-1-77, Cl. D10-111.000.

Burenga, Thomas I. Portable air compressor. 243,282, 2-1-77, Cl. D15-9.000.

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Downey, James A. Chair. 243,212, 2-1-77, Cl. D6-12.000.

Dreibelbis, Richard C., to Emerson Electric Co. (H & H Thermostats Division). Faucet. 243,240, 2-1-77, Cl. D23-25.000.

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Summa, James F.; and White, John R., 243,210.
Winrow, Thomas, to Futorian Corporation. Ottoman. 243,215, 2-1-77, Cl. D6-36.000.
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Yamagami, Masafumi: *See—*
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CLASSIFICATION OF PATENTS

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NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

239	4,005,494

CLASS 3

1.91	4,005,495
27	4,005,496

CLASS 5

68	4,005,497
81 R	4,005,498
334 R	4,005,499

CLASS 8

149.1	4,005,500

CLASS 13

9 ES	4,006,285
9 R	4,006,284

CLASS 15

22 R	4,005,502
250.42	4,005,503
339	4,005,501

CLASS 17

48	4,005,504

CLASS 19

150	4,005,505

CLASS 23

230 B	4,005,984
230 R	4,005,983
288 R	4,005,985
	4,005,986
313 FB	4,005,987

CLASS 24

68 E	4,005,506
133	4,005,509
150 R	4,005,507
193	4,005,508
250 R	4,005,510

CLASS 29

33 C	4,005,511
120	4,005,512
121.5	4,005,513
149.5 B	4,005,514
156.8 R	4,005,515
194	4,005,988
	4,005,989
196	4,005,990
196.2	4,005,991
432	4,005,520
469	4,005,521
517	4,005,522
581	4,005,523
623.1	4,006,034
629	4,005,524
748	4,005,517
749	4,005,516
752	4,005,518
818	4,005,519

CLASS 30

125	4,005,525
133	4,005,526

CLASS 33

111	4,005,527
143 F	4,005,528
181 R	4,005,529

CLASS 35

8 A	4,005,530

CLASS 36

28	4,005,531
44	4,005,532
62	4,005,533
72 R	4,005,534

CLASS 40

30	4,005,535
64 R	Re.29,127
104.02	4,005,536
125 H	4,005,537
132 R	4,005,538
143	4,005,539

CLASS 42

69 R	4,005,540

CLASS 43

57.5 A	4,005,541
85	4,005,542

CLASS 44

68	4,005,992
	4,005,993

CLASS 46

81	4,005,543
86 R	4,005,544
167	4,005,545

CLASS 47

1.4	4,005,546
28 R	4,005,547
45	4,005,548

CLASS 48

111	4,005,994
197 R	4,005,995
	4,005,996

CLASS 51

8 H	4,005,549
56 R	4,005,550
101 R	4,005,551
	4,005,552
218 R	4,005,553
249	4,005,554

CLASS 52

60	4,005,555
93	4,005,556
173 R	4,005,557
213	4,005,558
260	4,005,561
282	4,005,559
677	4,005,560

CLASS 53

57	4,005,562
138 A	4,005,563

CLASS 54

8	4,005,564

CLASS 55

32	4,005,997
84	4,005,998
93	4,005,999
323	4,006,000

CLASS 56

344	4,005,565

CLASS 57

34 B	4,005,566
34 TT	4,005,567
56	4,005,568
140 J	4,005,569

CLASS 58

16 D	4,005,570
39.5	4,005,571

CLASS 60

39.28 R	4,005,572
39.32	4,005,573
226 A	4,005,574
226 R	4,005,575
302	4,005,576
431	4,005,577
602	4,005,578
	4,005,579
657	4,005,580
660	4,005,581

CLASS 61

35	4,005,582

CLASS 62

2	4,005,583
29	4,006,001
112	4,005,584
158	4,005,585
372	4,005,586
401	4,005,587

CLASS 63

9	4,005,588

CLASS 65

114	4,006,002
135	4,006,003

CLASS 66

95	4,005,589

CLASS 68

5 D	4,005,590

CLASS 71

11	4,006,004
	4,006,005
14	4,006,006
76	4,006,007
88	4,006,008
90	4,006,009

CLASS 72

75	4,005,591
165	4,005,592
213	4,005,593
239	4,005,594
250	4,005,595
257	4,005,596
380	4,005,597
391	4,005,598

CLASS 73

59	4,005,599
133 A	4,005,600
146	4,005,601
170 R	4,005,602
194 M	4,005,603
194 VS	4,005,604
355 R	4,005,605
438	4,005,606
483	4,005,607
504	4,005,608

CLASS 74

230.17 S	4,005,609
237	4,005,610
416	4,005,611
470	4,005,612
489	4,005,613
501 R	4,005,614
504	4,005,615
512	4,005,616
516	4,005,617
640	4,005,618
804	4,005,619
865	4,005,620

CLASS 75

2	4,006,014
74	4,006,010
122	4,006,011
	4,006,012
130.5	4,006,013
171	4,006,015
221	4,006,016

CLASS 81

57.2	4,005,621
180 R	4,005,622
426	4,005,623

CLASS 82

20	4,005,624

CLASS 83

100	4,005,625
238	4,005,626
674	4,005,627

CLASS 84

304	4,005,628

CLASS 85

1 P	4,005,629

CLASS 86

1 A	4,005,630

CLASS 89

6.5	4,005,631
7	4,005,632
33 D	4,005,633
36 H	4,005,634

CLASS 90

11 C	4,005,635

CLASS 91

31	4,005,636
276	4,005,637
369 B	4,005,638
376 R	4,005,639
460	4,005,640

CLASS 92

2	4,005,641
122	4,005,642

CLASS 93

1 R	4,005,643
37 SP	4,005,644

CLASS 96

1 R	4,006,017
1.2	4,006,018
1.5	4,006,019
	4,006,020
27 E	4,006,021
48 R	4,006,022
90 R	4,006,023
115 R	4,006,024
129	4,006,025

CLASS 99

403	4,005,645
427	4,005,646

CLASS 100

4	4,005,647
53	4,005,648

CLASS 101

40	4,005,649
111	4,005,650
127.1	4,005,651
131	4,005,652
382 MV	4,005,653
426	4,005,654

CLASS 102

4	4,005,655
35.6	4,005,656
37	4,005,657
70.2 G	4,005,658
72	4,005,659
92.1	4,005,660

CLASS 106

14	4,006,026
38.5 R	4,006,027
47 R	4,006,028
58	4,006,029
74	4,006,030
307	4,006,031

CLASS 108

128	4,005,661

CLASS 109

16	4,005,662

CLASS 112

115	4,005,663
158 E	4,005,664

CLASS 113

116 V	4,005,665

CLASS 114

42	4,005,666
91	4,005,669
125	4,005,670
219	4,005,672
283	4,005,667
298	4,005,671

CLASS 115

1 C	4,005,673
41 R	4,005,674

CLASS 118

38	4,005,675
63	4,005,676
307	4,005,677
505	4,005,678

CLASS 119

14.08	4,005,680
35	4,005,679

CLASS 122

32	4,005,681

CLASS 123

8.19	4,005,682
25 B	4,005,683
30 D	4,005,684
33 G	4,005,685
41.38	4,005,686
53 A	4,005,687
117 R	4,005,688
119 A	4,005,689
	4,005,691
	4,005,692
119 F	4,005,690
122 D	4,005,693
148 E	4,005,694

CLASS 124

8	4,005,695
24 R	4,005,696

CLASS 126

39 E	4,005,697
270	4,005,698

CLASS 127

46 A	4,006,032
63	Re.29,129

CLASS 128

1.3	4,005,699
2 E	4,005,700
2.05 G	4,005,701
2.08	4,005,702
33	4,005,703
83.5	4,005,704
87 R	4,005,705
90	4,005,706
130	4,005,707
142 R	4,005,708
155	4,005,709
214 R	4,005,710
266	4,005,711
284	4,005,712
287	4,005,713
303.17	4,005,714
579 R	4,005,715

CLASS 131

70	4,005,716
84 R	4,005,717
140 C	4,005,718
148	4,005,719

CLASS 132

9	4,005,720
91	4,005,721
92 R	4,005,722

CLASS 134

6	4,006,033
167 R	4,005,723

CLASS 136

225	4,006,038
237	4,006,039

CLASS 137

38	4,005,724
112	4,005,725
119	4,005,726
269	4,005,727
270	4,005,728
344	4,005,729
	4,005,730
	4,005,731
512.1	4,005,732
625.4	4,005,733
625.63	4,005,734

CLASS 138

96 R	4,005,735

CLASS 139

79	4,005,736

CLASS 140

109	4,005,737

CLASS 141

67	4,005,668

CLASS 144

136 R	4,005,738

CLASS 148

1.5	4,006,040
6.16	4,006,041
16.5	4,006,042
27	4,006,043
31.55	4,006,044
187	4,006,045
	4,006,046

CLASS 150

8	4,005,739

CLASS 151

41.73	4,005,740

CLASS 156

90	4,006,048
195	4,006,049
234	4,006,050
247	4,006,051
280	4,006,052
394	4,006,053
656	4,006,047

CLASS 162

156	4,006,054

CLASS 164

54	4,005,741
	4,005,742
82	4,005,743
270	4,005,744

CLASS 165

2	4,005,745
69	4,005,746
134	4,005,747
151	4,005,748

CLASS 166

260	4,005,752
273	4,005,749
283	4,005,753
308	4,005,750
321	4,005,751

CLASS 169

46	4,005,754

CLASS 172

32	4,005,755
643	4,005,756
710	4,005,757

CLASS 174

15 WF	4,006,287
73 R	4,006,286
	4,006,288
102 R	4,006,289

CLASS 176

61	4,006,055

CLASS 177

229	4,005,758

CLASS 178

50	4,006,302
69 A	4,006,303
69.1	4,006,304
115	4,006,305

CLASS 179

1 E	4,006,308
1 GA	4,006,311
1 GQ	4,006,306
1 H	4,006,310
1 P	4,006,307
1 VC	4,006,309
6 R	4,006,312
15 BS	4,006,314
15 BT	4,006,313
82	4,006,315
84 R	4,006,316
111 R	4,006,317
121 C	4,006,318
175.3 R	4,006,319
175.31 R	4,006,320
180	4,006,321

CLASS 180

65 R	4,005,759
74	4,005,760

CLASS 181

141	4,005,761

CLASS 182

48	4,005,762

CLASS 184

24 4,005,763

CLASS 185

37 4,005,764

CLASS 188

1 A 4,005,766
1 C 4,005,765
203 4,005,767
218 A 4,005,768
315 4,005,769

CLASS 195

2 4,006,056
29 4,006,057
31 F Re.29,130
49 4,006,058
68 4,006,059
80 R 4,006,060
103.5 R 4,006,061

CLASS 197

1 R 4,005,770
64 4,005,771
84 R 4,005,772

CLASS 198

335 4,005,773
384 4,005,774

CLASS 200

16 A 4,006,322
42 T 4,006,324
48 A 4,006,325
61.24 4,006,326
61.25 4,006,327
61.54 4,006,328
61.64 4,006,121
83 D 4,006,329
144 B 4,006,331
144 C 4,006,330
148 E 4,006,332
157 4,006,333
4,006,334
159 B 4,006,335
246 4,006,336
284 4,006,323

CLASS 202

169 4,006,062

CLASS 204

1 T 4,006,063
51 4,006,064
59 R 4,006,065
67 4,006,066
151 4,006,067
159.11 4,006,068
180 G 4,006,069
192 4,006,070
228 4,006,071
238 4,006,072
298 4,006,073

CLASS 206

45.18 4,005,775
.84 4,005,778
306 4,005,776
497 4,005,777

CLASS 208

138 4,006,074
164 4,006,075
211 4,006,076
251 H 4,006,077

CLASS 210

23 F 4,006,078
36 4,006,079
45 4,006,080
58 4,006,081
83 4,006,082
90 4,006,083
180 4,006,084
195 S 4,006,085
242 R 4,006,086
289 4,006,087
321 B 4,006,088

CLASS 212

7 4,005,779
8 R 4,005,780

CLASS 214

1 BB 4,005,782
4,005,783
1 QG 4,005,781
6 B 4,005,784
16.1 EB 4,005,785
16.4 A 4,005,786
58 4,005,787
77 P 4,005,788
82 4,005,789
83.36 4,005,790
302 4,005,791
309 4,005,792
620 4,005,793

CLASS 219

8.5 4,006,337
10.55 F 4,006,338
4,006,339
121 P 4,006,340

CLASS 220

7 4,005,795
22.5 4,005,797
85 CH 4,005,798
85 R 4,005,796
288 4,005,799
337 4,005,800

CLASS 221

56 4,005,801

CLASS 222

14 4,005,802
57 4,005,803
144.5 4,005,804
178 4,005,805
193 4,005,806
442 4,005,807

CLASS 225

2 4,005,808
49 4,005,809

CLASS 226

6 4,005,810

CLASS 227

124 4,005,811
131 4,005,812

CLASS 228

184 4,005,813

CLASS 229

39 R 4,005,814
52 B 4,005,815

CLASS 232

35 4,005,816

CLASS 233

22 4,005,817

CLASS 235

61.11 D 4,006,342
61.11 E 4,006,343
61.7 R 4,006,341
68 4,006,344
69 4,006,345
144 ME 4,005,819
150.1 4,006,346
150.2 4,006,347
151.1 Re.29,132
151.31 4,006,348
151.34 4,006,349
151.35 4,006,350
152 4,006,351
4,006,352
194 4,006,353

CLASS 236

1 G 4,005,820
87 4,005,821

CLASS 239

265.31 4,005,822
265.37 4,005,823
289 Re.29,128
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413 4,005,825
533.8 4,005,826

CLASS 240

51.11 R 4,006,354
4,006,355

CLASS 241

261.3 4,005,827

CLASS 242

7.21 4,005,828
68.5 4,005,829
78.1 4,005,830
82 4,005,831
84.21 R 4,005,832
152.1 4,005,833
158.3 4,005,834

CLASS 244

17.13 4,005,835
110 B 4,005,836

CLASS 246

182 B 4,005,837
4,005,838
415 R 4,005,839

CLASS 248

118 4,005,840
188.7 4,005,841
200 4,005,842
220.2 4,005,843
311.3 4,005,844
419 4,005,845

CLASS 249

204 4,005,846

CLASS 250

203 R 4,006,356
310 4,006,357
339 4,006,358
358 P 4,006,359
461 B 4,006,360
510 4,006,361
518 4,006,362

CLASS 251

148 4,005,847
173 4,005,848
305 4,005,849

CLASS 252

51.5 R 4,006,089
62.56 4,006,090
90 4,006,091
95 4,006,092
106 4,006,093
188 4,006,095
194 4,006,094
301.1 S 4,006,096
301.4 F 4,006,097
312 4,006,098
373 4,006,099
4,006,100
429 C 4,006,101
438 4,006,103
454 4,006,102
465 4,006,104
4,006,105
513 4,006,106
518 4,006,107
522 4,006,108
4,006,109
540 4,006,110
555 4,006,111

CLASS 254

2 R 4,005,850
139 4,005,851
173 R 4,005,852

CLASS 259

3 4,005,853
4 R 4,005,854
185 4,005,855

CLASS 260

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23.7 R 4,006,113
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31.8 N 4,006,115
33.6 AQ 4,006,116
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77.5 AQ 4,006,125
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156 4,006,128
4,006,129
173 4,006,130
181 4,006,131
192 4,006,132
239 BD 4,006,135
240 D 4,006,137
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243 C 4,006,138
243 R 4,006,139
246 B 4,006,140
250 AC 4,006,141
250 QN 4,006,142
256.4 N 4,006,143
268 TR 4,006,144
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272 4,006,146
289 K 4,006,148
290 P 4,006,149
294.8 F 4,006,150
4,006,151
295 R 4,006,152
302 E 4,006,154
302 H 4,006,153
306.5 4,006,155
306.7 R 4,006,156
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309 4,006,160
309.6 4,006,247
325 PH 4,006,162
325 R 4,006,161
326 C 4,006,163
326.5 B 4,006,164
343.6 4,006,165
346.8 A 4,006,166
4,006,167
4,006,168
348 R 4,006,169
378 4,006,170
384 4,006,171
397.2 4,006,172
413 4,006,173
429.1 4,006,174
438.5 R 4,006,175
448.2 N 4,006,176
449 M 4,006,177
465 D 4,006,178
468 J 4,006,179
473 F 4,006,180
474 4,006,181
486 H 4,006,147
502.5 4,006,182
558 S 4,006,183
570.7 4,006,184
575 4,006,185
577 4,006,186
4,006,187
586 R 4,006,188
601 R 4,006,189
602 4,006,190
610 B 4,006,191
615 R 4,006,192
617 R 4,006,193
621 C 4,006,194
650 R 4,006,195
654 R 4,006,196
676 MS 4,006,197
682 4,006,198
683.15 B 4,006,199
836 4,006,200
878 R 4,006,201
880 R 4,006,202
940 4,006,203
958 4,006,204

CLASS 261

39 R 4,006,205

CLASS 264

3 E 4,006,206
108 4,006,207
176 F 4,006,208
211 4,006,209
250 4,006,210
291 4,006,211

CLASS 266

161 4,005,856
191 4,005,857

CLASS 267

136 4,005,858

CLASS 271

161 4,005,794

CLASS 272

70.3 4,005,859

CLASS 273

1.5 R 4,005,860
22 4,005,861
73 D 4,005,862
4,005,863
73 R 4,005,864
109 4,005,865
131 A 4,005,866
135 R 4,005,867
156 4,005,868
158 4,005,869
183 R 4,005,870

CLASS 274

1 R 4,005,871

CLASS 280

11.37 H 4,005,872
63 4,005,873
289 H 4,005,874
610 4,005,875
741 4,005,876
748 4,005,877

CLASS 283

8 R 4,005,878

CLASS 285

31 4,005,879
47 4,005,880
111 4,005,881
194 4,005,882
322 4,005,883
323 4,005,884

CLASS 292

144 4,005,885
177 4,005,886
216 4,005,887
256.71 4,005,888
262 4,005,889
346 4,005,890

CLASS 293

84 4,005,891

CLASS 294

1 R 4,005,892
28 4,005,893
65.5 4,005,895
67 BA 4,005,896
88 4,005,894
115 4,005,897

CLASS 296

23 R 4,005,898
97 E 4,005,899
137 B 4,005,900
4,005,901

CLASS 297

129 4,005,902
328 4,005,903
389 4,005,904

CLASS 299

31 4,005,905
91 4,005,906

CLASS 301

36 R 4,005,907

CLASS 302

3 4,005,908

CLASS 303

91 4,005,909
96 4,005,910
111 4,005,911

CLASS 305

13 4,005,912

CLASS 307

88.3 4,006,363
119 4,006,364
205 4,006,365
238 4,006,366
252 B 4,006,367
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CLASS 308

6 C 4,005,913
9 4,005,914
36 R 4,005,915
36.1 4,005,916
72 4,005,917

CLASS 310

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4,006,373
40 MM 4,006,374
49 R 4,006,375

CLASS 312

27 4,005,918
214 4,005,919

CLASS 313

95 4,006,376
112 4,006,377
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481 4,006,381

CLASS 315

39.53 4,006,382
169 TV 4,006,383
323 4,006,384
400 4,006,385

CLASS 316

19 4,005,920

CLASS 317

5 4,006,386
27 R 4,006,387
100 4,006,388
249 D 4,006,389
262 S 4,006,390

CLASS 318

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266 4,006,392
473 4,006,393
594 4,006,394
685 4,006,395

CLASS 320

2 4,006,396
31 4,006,397

CLASS 322

47 4,006,398
4,006,399

CLASS 323

19 4,006,400
92 4,006,401
94 H 4,006,402

CLASS 324

15 4,006,403
33 4,006,404
34 R 4,006,406
34 TK 4,006,405
40 4,006,407
41 4,006,408
51 4,006,409
52 4,006,410
61 R 4,006,411
96 4,006,412
103 P 4,006,413
106 4,006,414
166 4,006,417
182 4,006,415

CLASS 325

30 4,006,416
38 R 4,005,818
163 4,006,418
348 4,006,419
363 4,006,420
474 4,006,421

CLASS 328

233 4,006,422

CLASS 329

103 4,006,423
117 4,006,424
160 4,006,425

CLASS 330

4.3 4,006,426
29 4,006,427
51 4,006,428

CLASS 331

14 4,006,429
65 4,006,430
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243,218	8 : 243,276	243,290	243,265	39 : 243,231	243,247
243,235	243,289	18 : 243,216	243,281	243,239	243,248
243,236	9 : 243,210	24 : 243,221	29 : 243,211	243,274	51 : 243,209
243,245	12 : 243,215	243,227	243,220	243,278	243,286
243,252	243,222	243,269	243,229	40 : 243,212	55 : 243,241
243,253	13 : 243,259	25 : 243,224	34 : 243,240	243,219	243,261
243,256	243,268	243,225	36 : 243,238	42 : 243,226	243,282

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[Notice of Dec. 16, 1969, 869 O.G. 6877]

1 : T955,002	34 : T955,001 36 : T955,006	T955,007 T955,008	T955,010	42 : T955,004	48 : T955,005

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